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BASELINE REPORT FOR THE FORT HOOD ARMY BASE: SEPT. 1, 2001 TO AUG. 31, 2002

A Research Project for the U.S. Army C.E.R.L.
and the Ft. Hood Energy Office

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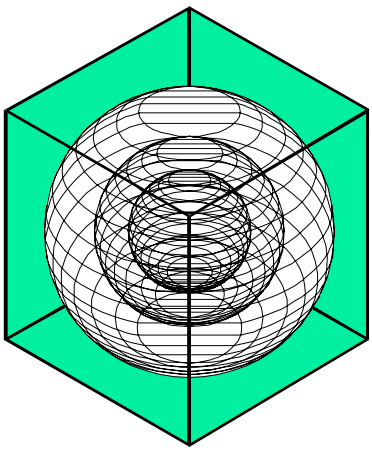

ENERGY SYSTEMS LABORATORY

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PREFACE

This report is the 2001/2002 baseline report for a multi-year Research Project performed for the U.S. Army Construction Engineering Research Laboratory, and the Ft. Hood Energy Office. This project was carried out in several phases. The first phase included the development of a Preliminary Monitoring and Analysis Plan (PreMAP), and the purchase and the installation of data monitoring equipment, which was delivered in the Spring of 2001. The data recorded for the buildings (logger data and manual data), as well as the whole-base natural gas use over a several year period are also reported in this baseline report.

Later in 2001, additional data loggers were installed in the main and west-base electrical substations, and a steam/temperature channel was installed in the thermal plant. Installation of the III Corp building was also initiated in November of 2001 and completed in 2002. The data from the III Corp building are analyzed and reported in this report. Data were also obtained from the Darnall Hospital[1] and are reported in this report. Data collected from the Main Substation and West Substation requires further verification before a baseline analysis can be performed.

[1] These data are from a separate contract to perform Continuous Commissioning for the Darnall Hospital.

ABSTRACT

This report presents electricity, natural gas and cooling baselines for the thermal plant, buildings located in the 87000 block, and the III Corp building at Ft. Hood. A baseline analysis is also presented for the natural gas consumption for the Ft. Hood Army base. The baselines developed for this report include data measured during 2001/2002 for the thermal plant, 87000 block buildings, and III Corp building and natural gas data recorded over a several year period. Baseline analyses are presented for individual channels and groups of channels that represent loads determined to be of value to Ft. Hood. Preliminary baselines are also presented on new buildings for which manual data were provided for 2002 (see Appendix). However, additional data collection is recommended for these buildings before accurate baseline can be developed.

This report is divided into different sections that correspond to the different baseline analysis that were performed on the measured loads, including: an analysis of the chiller performance, an analysis of the weather-dependent channels at the thermal plant, baseline models for the 87000 block manual readings, III Corp building, and a whole-base natural gas baseline analysis. A description of the analysis methods is provided in the introduction. Additional details that pertain to the data that were collected are provided in each section. An appendix is also provided that includes information about the data logger parameter sets, and the daily data recorded manually for the 87000 block buildings, and daily data recorded manually for the new buildings.

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1. INTRODUCTION

This report presents electricity, natural gas and cooling baselines for the thermal plant, buildings located in the 87000 block, the III Corp building and preliminary baselines on buildings added to the manual polling procedures at Ft. Hood. A baseline analysis is also presented for the natural gas consumption for the Ft. Hood Army base. The baselines developed for this report include data measured during the period September 2001 to August 2002 for the thermal plant and 87000 block buildings, natural gas data and data for the Darnall Hospital recorded over a several year period. Baseline analysis are presented for individual channels and groups of channels that represent loads determined to be of value to Ft. Hood.

2. METHODOLOGY

Several analysis methodologies have been used to develop the characteristic baselines for the buildings and the thermal plant. In general, these methodologies have been carefully chosen to be consistent with the methodologies recommended by ASHRAE and the USDOE, specifically, ASHRAE Guideline 14 (ASHRAE 2002), the USDOE 2001 IPMVP (IPMVP 2001). Additional relevant references are provided in the Reference section of this report.

2.1. Weather dependency.

Name	Section	Independent Variable(s)	Form	Examples
No Adjustment /Constant Model	6.1.4.1	None	$E = E_b$	Non weather sensitive demand
Day Adjusted Model	6.1.4.2	None	$E = E_b \times \frac{day_b}{day_c}$	Non weather sensitive use (fuel in summer, electricity in summer)
Two Parameter Model	6.1.4.3	Temperature	$E = C + B_1(T)$	
Three Parameter Models	6.1.4.4	Degree days/Temperature	$E = C + B_1(DD_{BT})$ $E = C + B_1(B_2 - T)^+$ $E = C + B_1(T - B_2)^+$	Seasonal weather sensitive use (fuel in winter, electricity in summer for cooling) Seasonal weather sensitive demand
Four Parameter, Change Point Model	6.1.4.5	Temperature	$E = C + B_1(B_3 - T)^+ - B_2(T - B_3)^+$ $E = C - B_1(B_3 - T)^+ + B_2(T - B_3)^+$	
Five Parameter Models	6.1.4.6	Degree days/Temperature	$E = C - B_1(DD_{TH}) + B_2(DD_{TC})$ $E = C + B_1(B_3 - T)^+ + B_2(T - B_4)^+$	Heating and cooling supplied by same meter.
Multi-Variate Models	6.1.4.7	Degree days/Temperature, other independent variables	Combination form	Energy use dependent non-temperature based variables (occupancy, production, etc.).

Table 2.1-1: ASHRAE Guideline 14P Regression Models.

The analysis used for weather normalization consists of linear and change-point linear models calculated with the Emodel program (Kissock 1993; Kissock et al. 1992) as shown below in Table 2.1-1. These models are consistent with ASHRAE's Proposed Guideline 14 (ASHRAE 2002).

For each of the channels that were found to exhibit a weather dependency, the appropriate linear or change-point linear model was chosen from the models indicated in Table 2.1-1. The models chosen and the results of the regressions are presented later in this report.

2.2. Analysis of chiller cooling production data.

The analysis of the recorded chiller cooling production data uses the quadratic functional form used in the DOE-2 energy simulation program to model part-load equipment and plant performance characteristics (Haberl et al. 1997, LBNL, 1980, 1981, 1982, 1989). This quadratic functional form is also compatible with ASHRAE's Guideline 14.

When the chiller electricity use, chilled water production, chilled water supply temperature, and condenser water temperature returning to the chiller are available, the functional form for the tri-quadratic model is as follows:

Quadratic: kW/ton = a + b x Tons + c x Tcond + d x Tevap + e x Tons^2 + f x Tcond^2
+ g x Tevap^2 + h x Tons x Tcond + I x Tevap x Tons
+ j x Tcond x Tevap + k x Tons x Tcond x Tevap.

When the chiller electricity use, chilled water production, and chilled water supply temperature are available, the functional form for the bi-quadratic model is as follows:

Quadratic: kW/ton = a + b x Tons + c x Tevap + d x Tons^2
+ e x Tevap^2 + f x Tevap x Tons

During the 2001/2002 period, the condenser water temperature channel was added to the thermal plant at the 87000 block complex. Therefore, the tri-quadratic model was used. The analysis for each of the chillers is presented later in this report.

2.3. Data Collection

2.3.1. 87000 Block Thermal Plant

In order to provide Ft. Hood with baseline models of the 87000 block one data logger was installed in 2001 in the thermal plant. This section of the report contains the electrical and thermal monitoring diagrams for the loggers that were installed. Appendix A contains the logger parameter sets that are used to configure the logger.

The electrical loads for logger #938 are shown in Figure 2.3.1-1. These loads include the main electric loads on CT0, CT1 and CT2, and the chiller submetering on CT3, CT4, CT5 and CT6.

The ambient conditions monitored by logger #938 are shown in Figure 2.3.1-2, which include the ambient temperature and relative humidity.

The thermal loads monitored by Logger #938 are shown in Figure 2.3.1-3, and includes the chilled water flow, and chilled water supply and return temperatures for chillers 1 and 2, and the natural gas used by the plant.

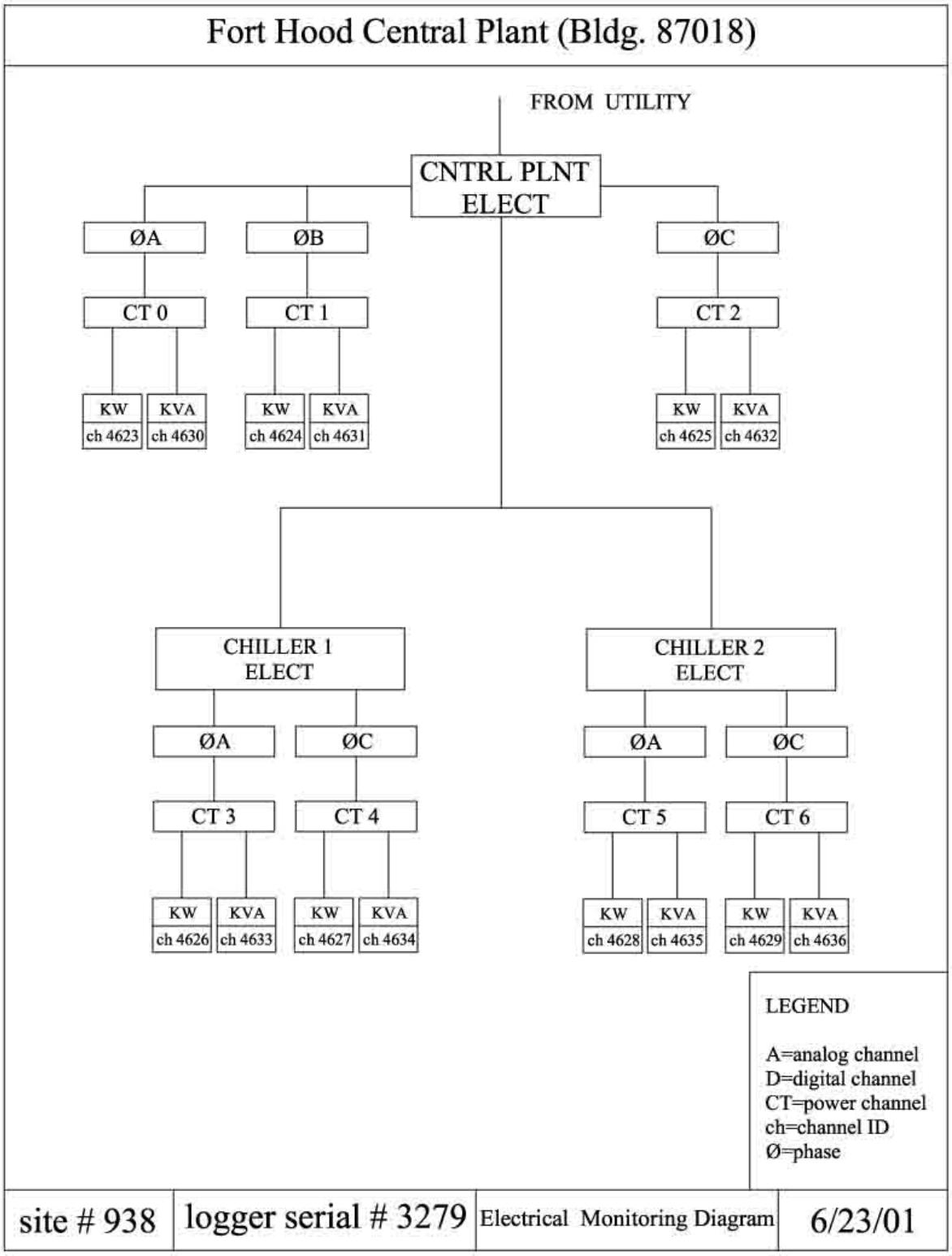


Figure 2.3.1-1: Electrical Monitoring Diagram for 87000 Block Thermal Plant

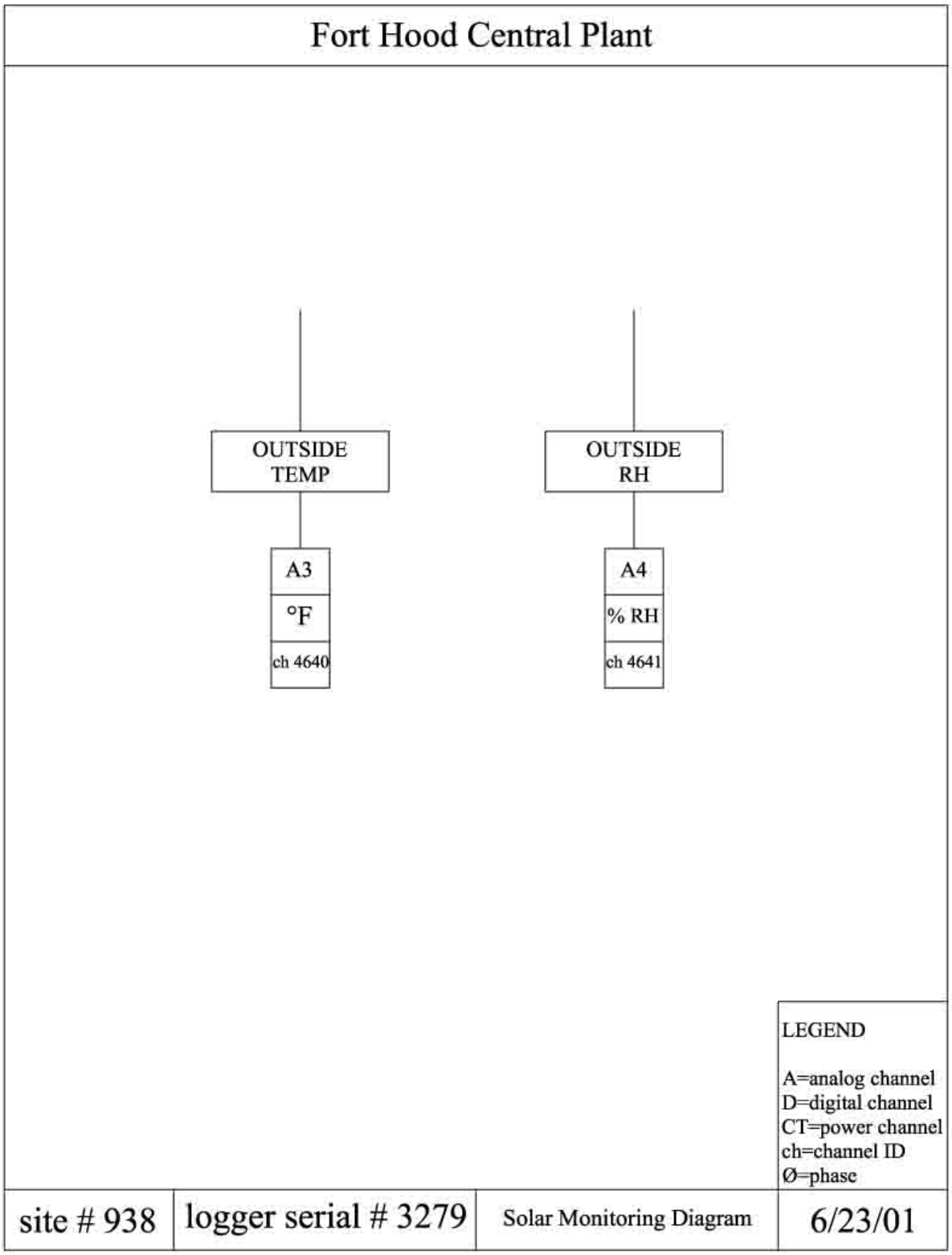


Figure 2.3.1-2: Ambient Conditions Monitored at 87000 Block Thermal Plant

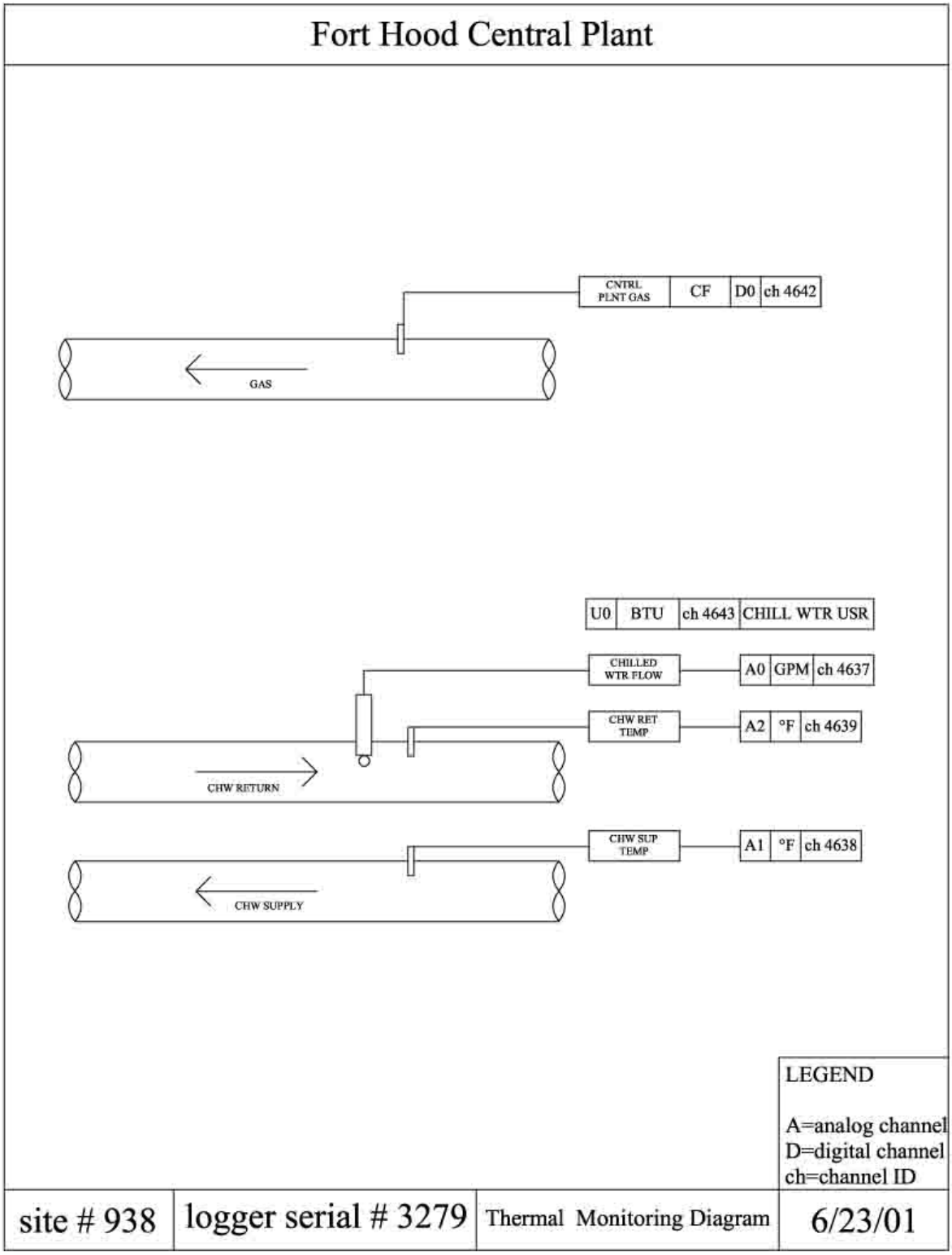


Figure 2.3.1-3: Thermal Monitoring Diagram for 87000 Block Thermal Plant

3. DATA COLLECTED DURING THE PERIOD SEPTEMBER 2001 TO AUGUST 2002.

3.1. Loggers reported on in this report.

The loggers currently being polled at Ft. Hood include the following sites. A complete listing of all the channels are provided in the appendix to this report. A brief explanation of the loggers at the Thermal plant and the III Corp building is provided in this section.

938 - 3279 - Ft Hood - Central Thermal Power Plant (8700)
941 - 1141 - Main Electrical Substation #1
944 - 1144 10076 Ft Hood - Clear Creek Substation
946 - 1146 - Main Electrical Substation #2
947 - 10043 - III Corps
948 - 1148 - Central Elect Power Plant (Main Substation #3)
949 - 10082 - Ft Hood West Substation
939 - 3832 - Darnall Hospital #1
940 - 3831 - Darnall Hosptial #2

3.1.1. Logger #938 - 3279 - Ft Hood - Central Thermal Power Plant (8700)

3.1.1.1.Electricity use monitoring

Figure 3.2-1 displays a time series plot of the electricity data that were recorded for the period from May to September 2001. The upper graph of this figure shows the whole-plant electricity use and the electricity used by the chiller, which represents a significant portion of the plant's electricity use, as expected. The lower graph in this figure shows the derived electricity use, which is calculated by subtracting the chiller electricity use from the whole-plant electricity use, and represents electricity use of the chilled water pumps, and other parasitic loads in the plant. This has been labeled as chiller pump electricity since the chiller pumps are felt to account for the largest portion of this use. Values are shown for data only when one or both chillers are operating.

Several features are worth noting in these plots. First, the chiller clearly represents the largest portion of the plants electricity use. The plant's electricity use is less than 100 kWh/hr when the chillers are not running. Second, aside from start up transients, the plant operates at a relatively constant load when the chillers are running, and consumes very little power when the chillers, and associated loads, are not running.

3.1.1.2.Thermal energy use monitoring

The thermal energy of the plant is shown in Figure 3.2-2. In the upper graph the natural gas use is shown. The calculated chilled water production is shown in the lower graph (i.e., this is calculated by multiplying the recorded flow rate times the temperature difference).

Several features are worth noting in these plots. First, in the upper plot of Figure 3.2-2, two distinct periods of consumption appear, before and after the retrofit of the buried chilled water and steam lines. After the completion of the construction it is clear that steam use dropped dramatically.

Chilled water data was discontinued from October 2001 through May 2002 due to construction.

3.1.1.3.Ambient conditions monitoring

In Figure 3.2-3 the data that represent the ambient conditions are shown, and in Figure 3.2-4 the measured ambient temperature and humidity are compared against similar hourly data from the National Weather Service (NWS). Although there is significant scatter in the temperature and humidity comparison graphs, the scatter in the data shown are similar to comparisons at other sites. There are several reasons for this large amount of scatter. First, the NWS data represent a 3 to 5 minute recording window centered at 15 minutes before the hour. Hence, for example, the readings at 10:00 a.m. would represent the average of measurements taken from 9:42 to 9:45 a.m.; whereas, the 10:00 a.m. measurements on the data logger would represent the average of measurements taken from 9:00 a.m. to 10:00 a.m. Second, in the case of the humidity measurements, the large amount of scatter is caused in part by the error in several instruments (i.e., the wet bulb reading and dry bulb reading needed to compute the RH measurements compared to the RH measurement at the thermal plant).

3.1.1.4.Chiller monitoring

Additional data regarding the chiller monitoring can be seen in Figure 3.2-5. In September and October of 2001 the chilled water flow ranged from 1,200 gallons per minute (gpm) to 1,600 gpm. In May of 2002 the flow increased dramatically to about 2,800 gpm.

The chilled water temperature difference and supply and return temperatures indicate a large variation in the operation of the cooling system, and therefore an opportunity to improve chiller efficiency. Chilled water temperatures should be kept in the range of 10 to 15 F for optimal operation. Also note that temperatures recorded from October to May represent the construction period, and are therefore invalid. In general chilled water supply temperatures in the 2001/2002 monitoring period were much lower, and hence much less efficient than in 2000/2001.

The hourly and daily chiller electricity use are plotted against the ambient temperature as shown in Figure 3.2-6. In the upper graph, that represent the hourly chiller data, it is clear to see that there are two different groups of data representing the operation of one or both chillers. From this graph it appears that the operation of one chiller begins in the 45 F range. From about 65 F to the hottest conditions there significant periods when either one or two chillers are used. Hence, hourly data were felt to be not appropriate for modeling.

In the lower graph, that represents the daily electricity use of both chillers, there is a considerable consolidation of the data trends versus ambient temperatures. However, there is still a clear upper group of data that represent fully loaded chillers at 5,000 to 12,000 kWh/day and data in other areas representing other combinations of one or more chillers. This is one of the reasons for the low R2 and high CV(RMSE) calculated by the regressions performed later in this report.

The hourly and daily cooling loads as measured by the chilled water are shown in Figure 3.2-7. In the upper graph, that represents the hourly chilled water loads, there is considerable scatter. However, when the data are consolidated into daily data there is considerable less scatter, and hence the data are more appropriate for modeling with the regressions performed later in this report. In the lower graph the lack of a difference in weekday and weekend data indicate continuous 7 day per week operation.

3.1.1.5.Natural gas monitoring

In Figure 3.2-8 the natural gas use of the plant is shown. As previously discussed, these data show two distinct usage patterns, before and after the construction, which are analyzed accordingly.

3.1.2. Logger: #947 - 10043 - III Corps

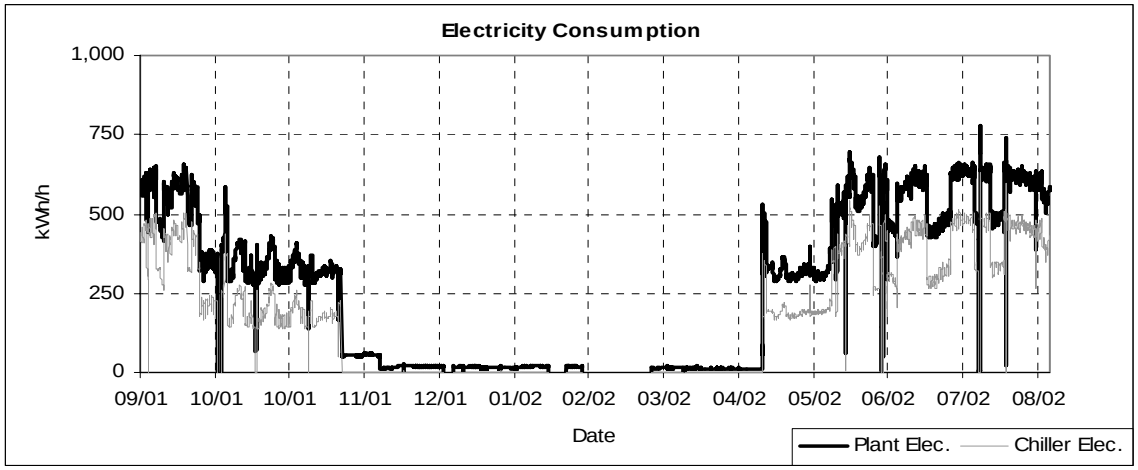
Figure 3.2-9 shows the whole-building electricity use, chiller electricity use and motor control center electricity use (MCC) for the III Corp building. Figure 3.2-10 shows the whole-building natural gas use. Figure 3.2-11 shows the whole-building natural gas use versus ambient temperature and Figure 3.2-12 shows the whole-building chiller electricity use versus temperature.

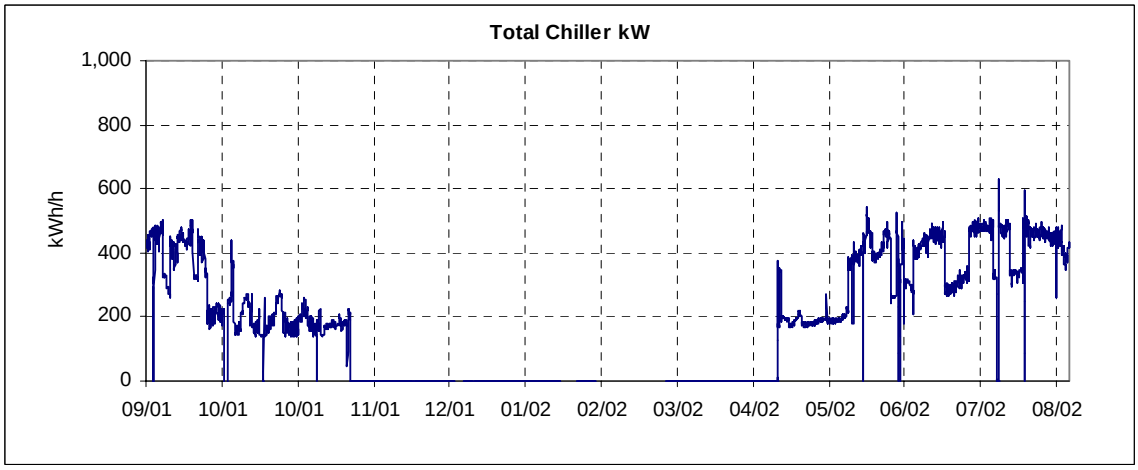
3.1.3. Loggers: #939 - 3832 - Darnall Hospital #1 and #940 - 3831 - Darnall Hospital #2

Data loggers have also been installed in the Darnall Hospital. Figure 3.2-13 shows the whole-building electricity use and the chiller electricity use. Figure 3.2-14 shows the electricity use of several motor control centers. Figure 3.2-15 shows the whole-building natural gas use.

3.2. Whole-base Natural Gas Use.

The whole-base natural gas use consists of three meters that combine into a total natural gas use for the whole-base. Data for 1999 and 2000 were modeled with three-parameter change-point linear models, including monthly and daily energy use. This analysis is discussed later in this report.





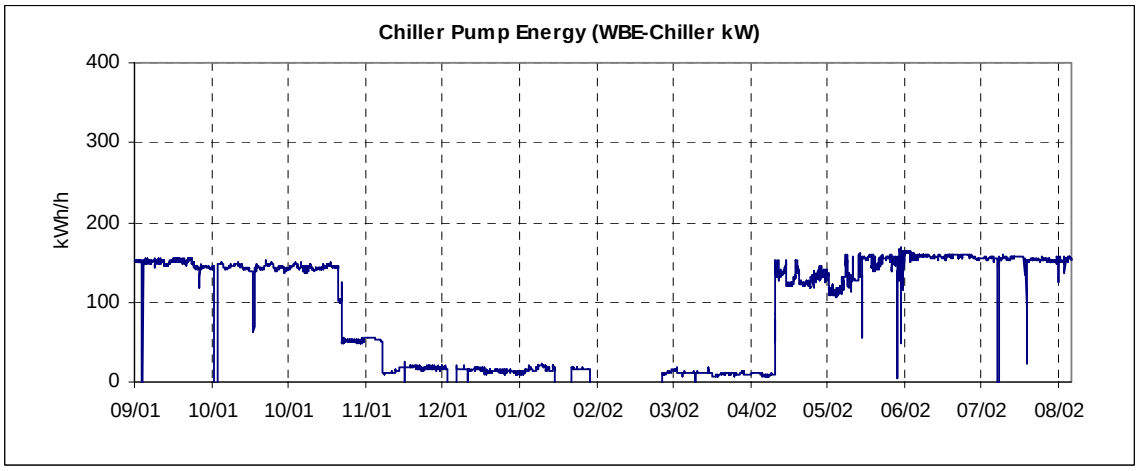


Figure 3.2-1: 87000 Block Thermal Plant Electricity Use: Total, Chiller & Pump Use.

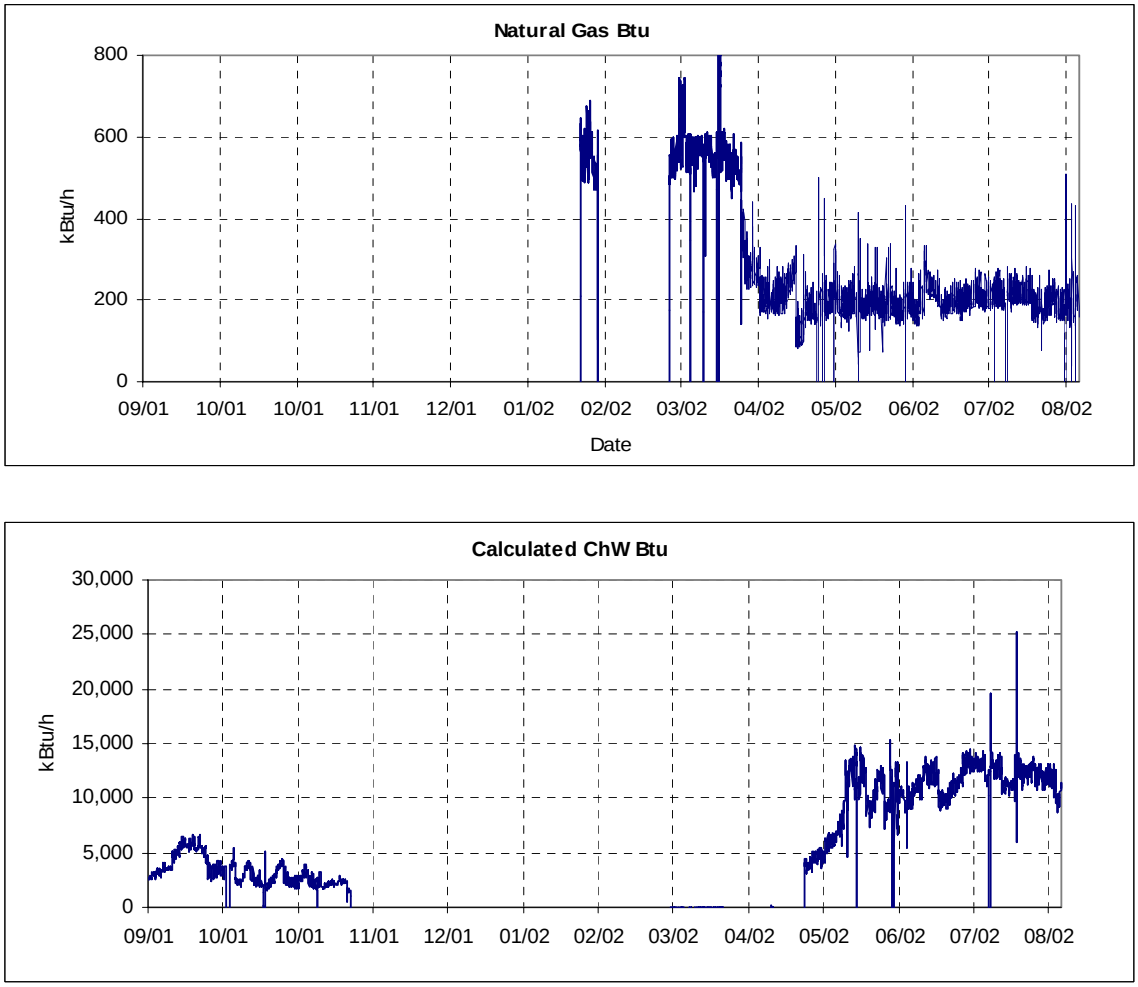


Figure 3.2-2: 87000 Block Thermal Plant Heating and Cooling Use.

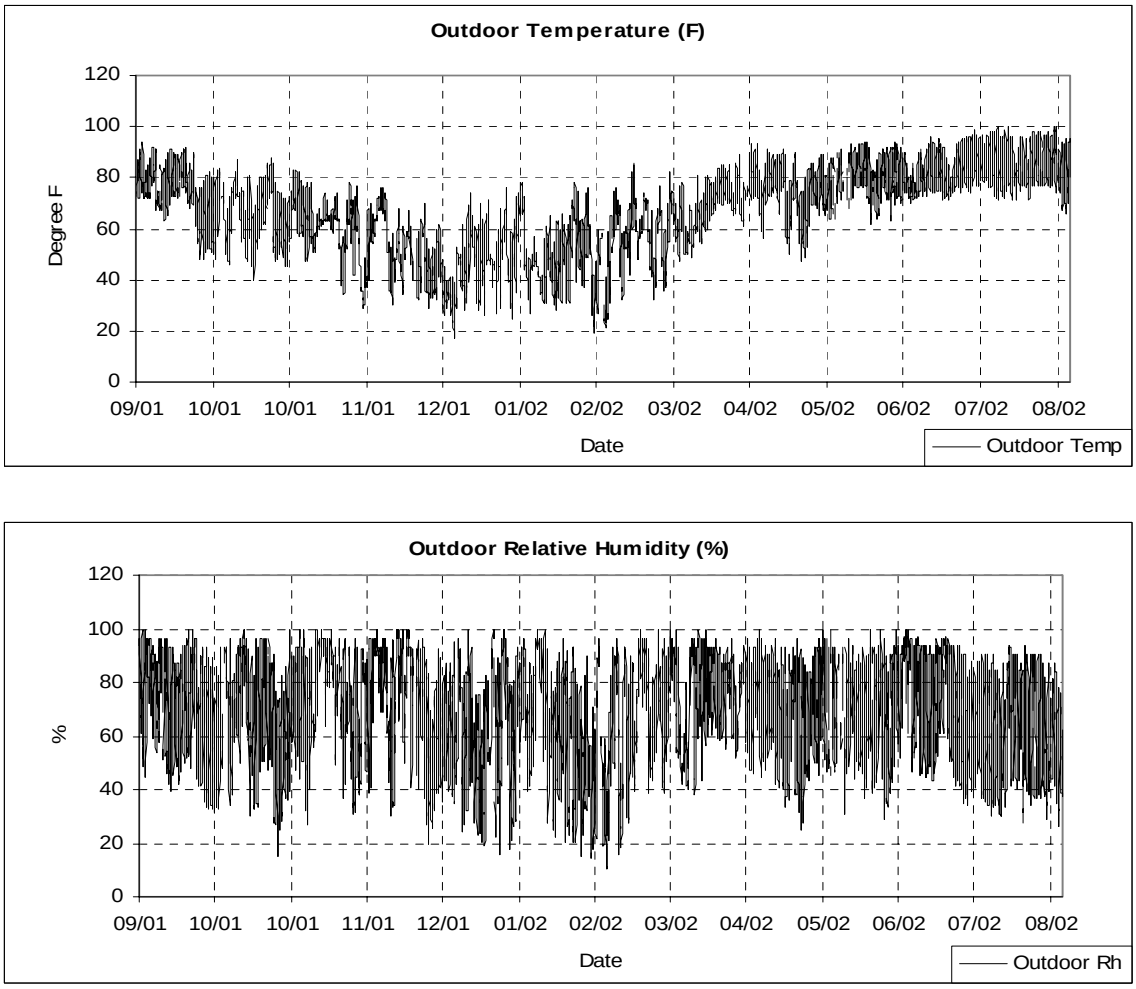


Figure 3.2-3: 87000 Block Thermal Plant Ambient Conditions.

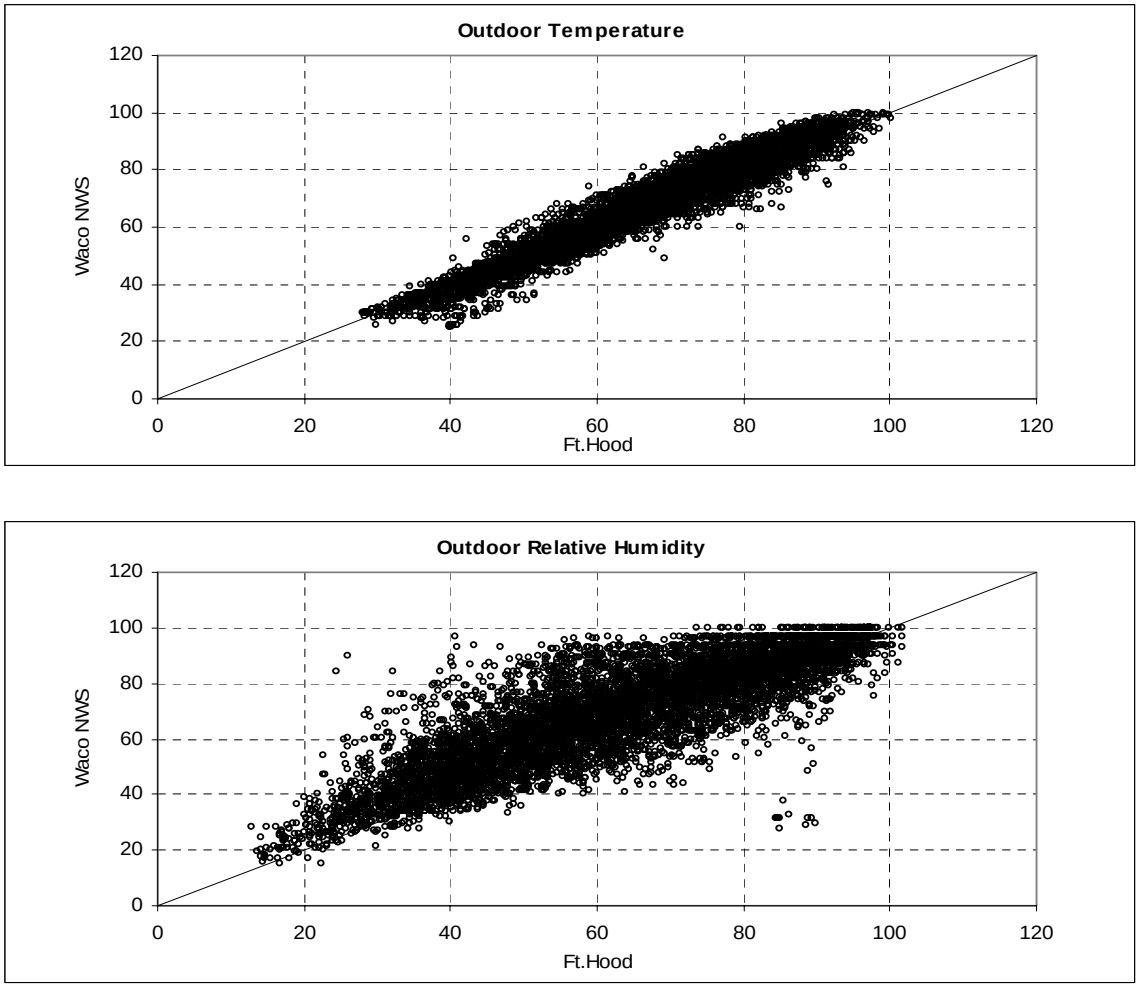


Figure 3.2-4: 87000 Block Thermal Plant Measured Ambient Conditions vs NWS Ambient Conditions (Waco): Temperature and Humidity.

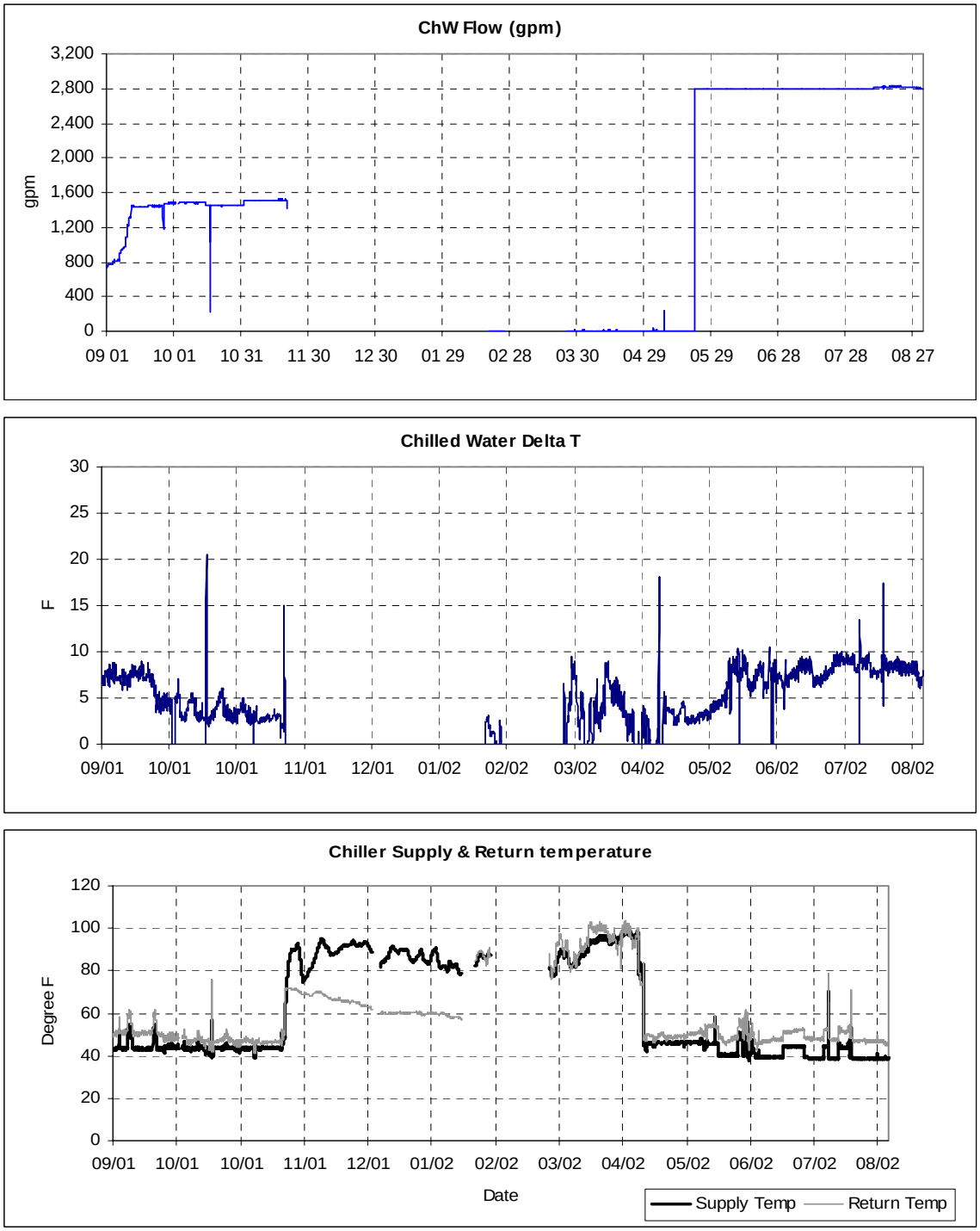


Figure 3.2-5: 87000 Block Thermal Plant Chiller Monitoring Flow, and Supply and Return Temperatures.

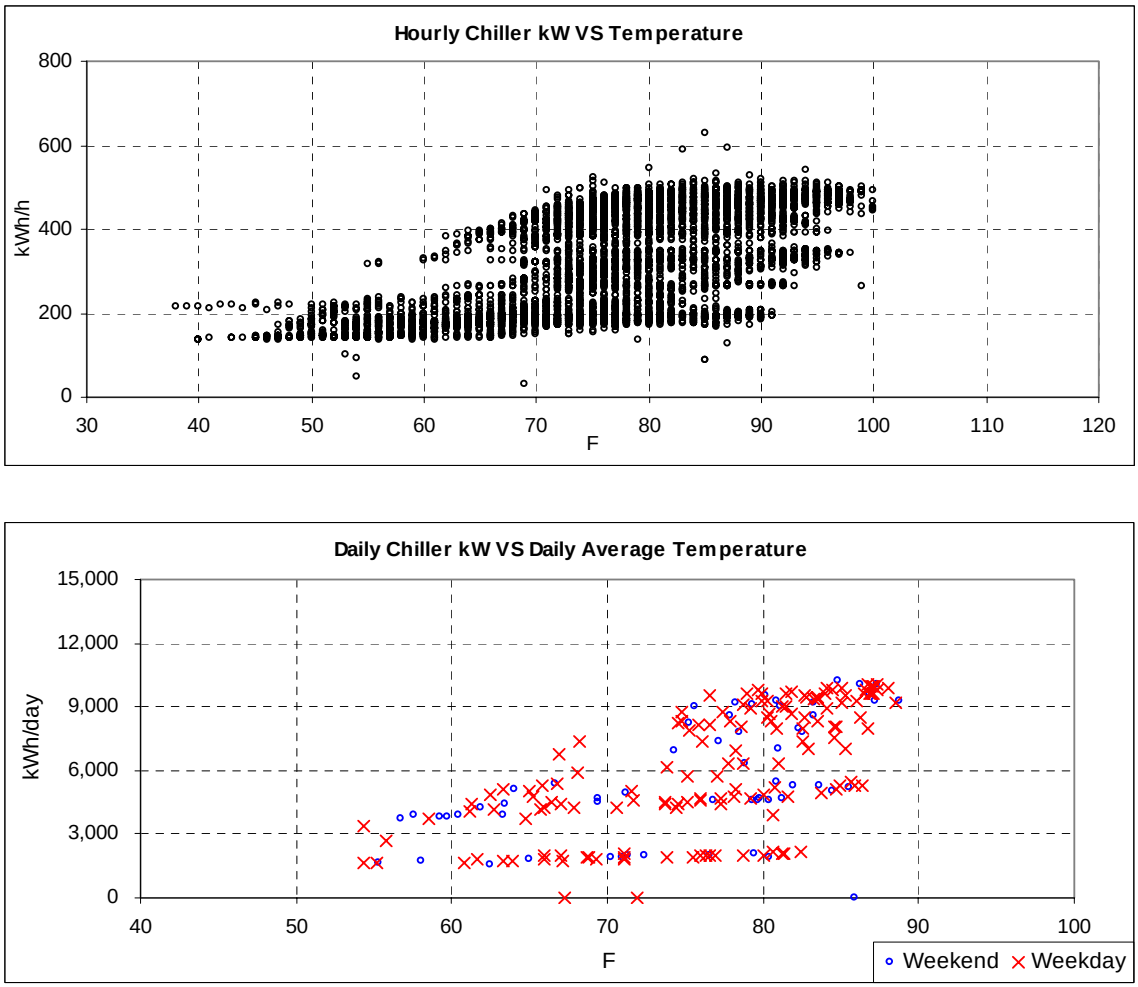


Figure 3.2-6: 87000 Block Thermal Plant Chiller Electricity Use vs Ambient Conditions (hourly and daily data).

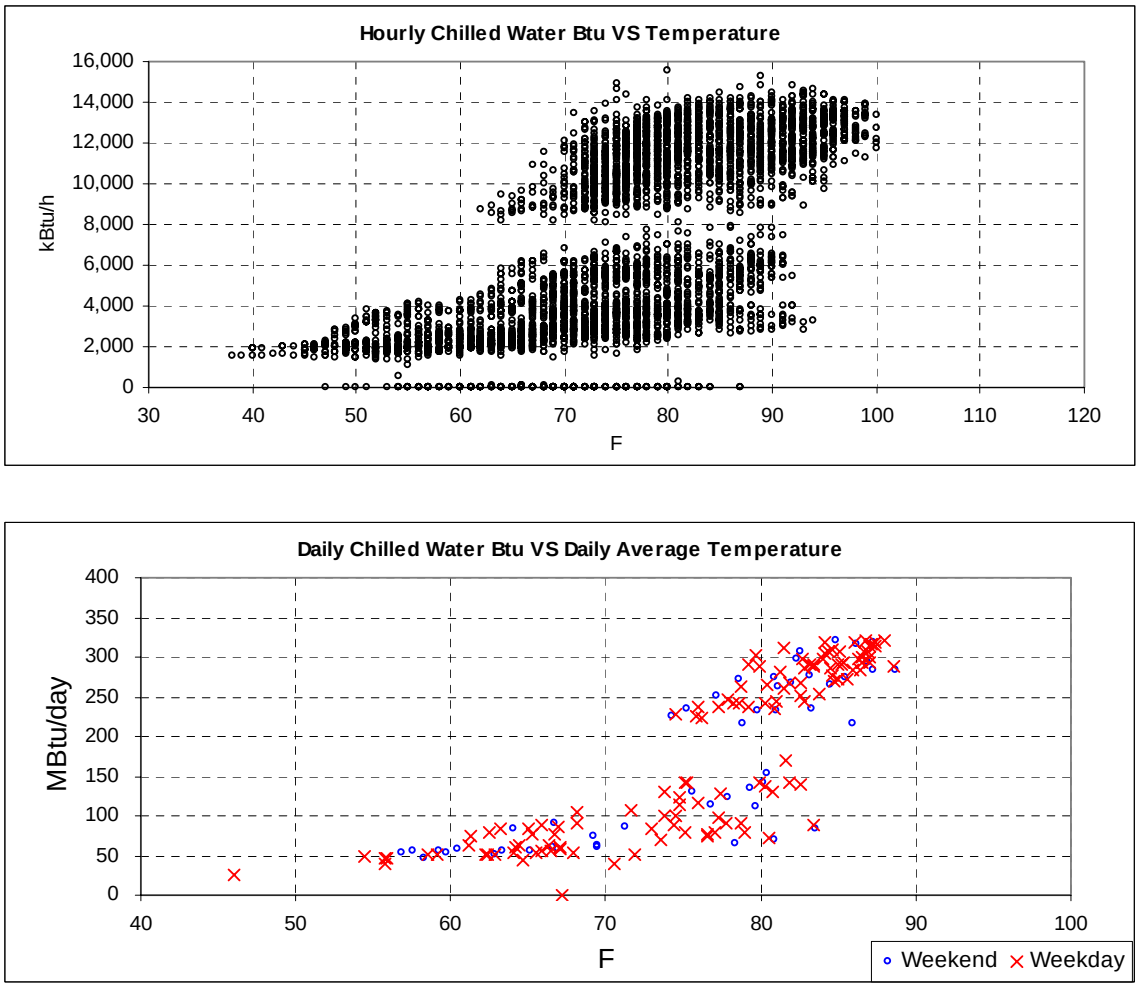
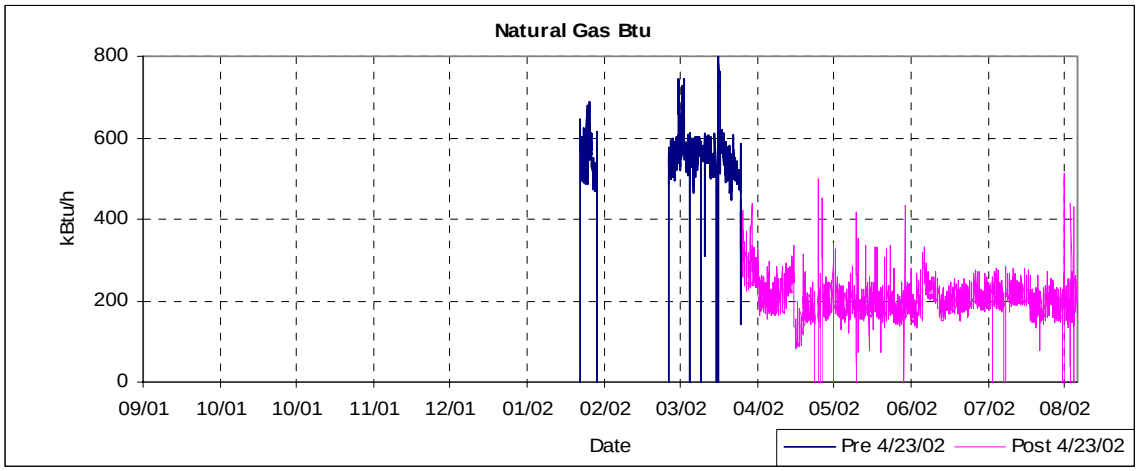
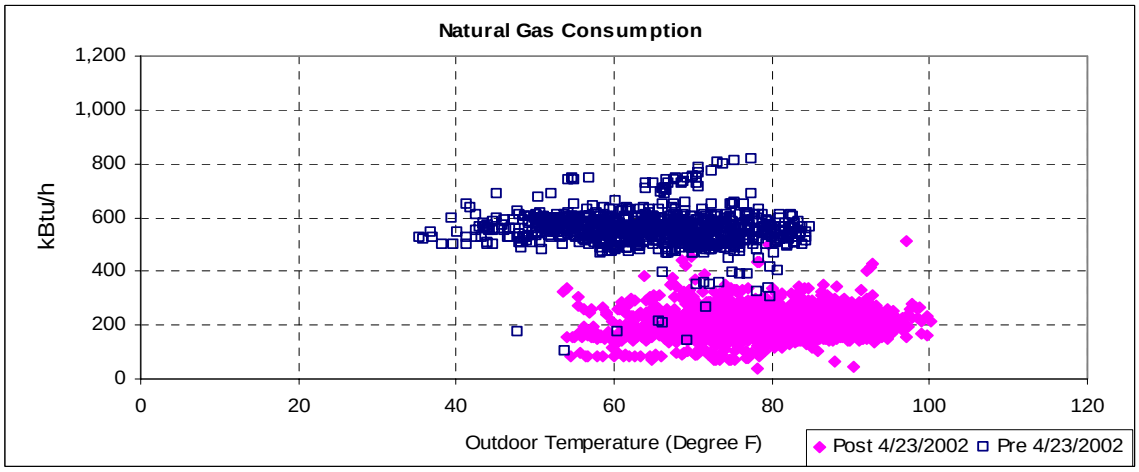


Figure 3.2-7: 87000 Block Thermal Plant Chilled Water Production vs Ambient Conditions (hourly and daily data).





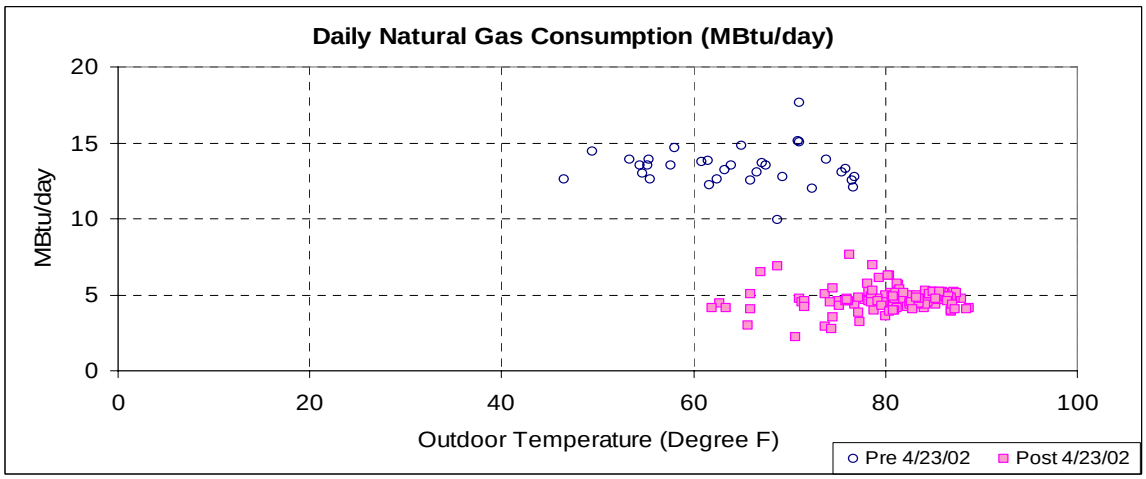


Figure 3.2-8: 87000 Block Thermal Plant Natural Gas Consumption vs Ambient Conditions (hourly data).

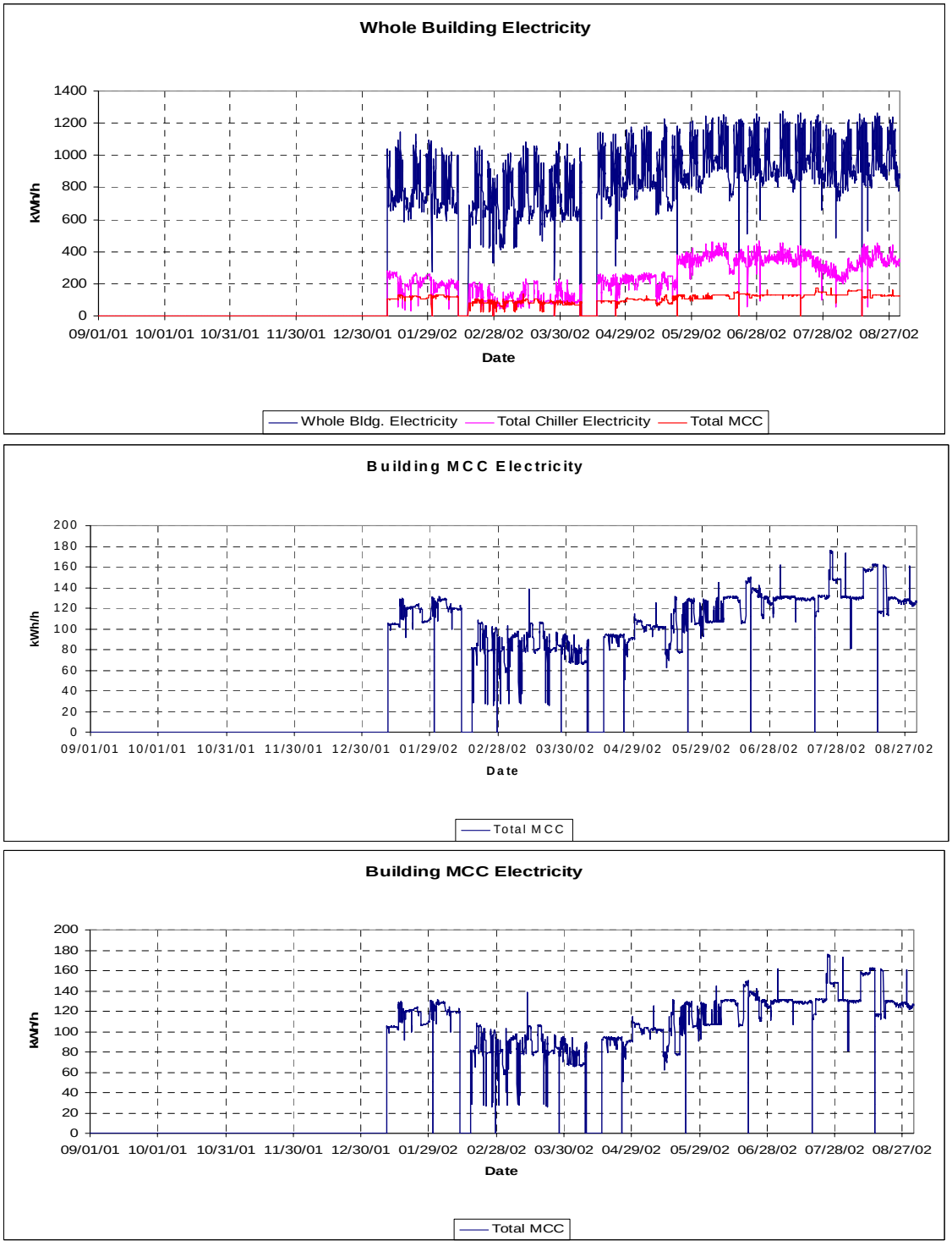


Figure 3.2-9: III Corp Electricity Use: Whole-building, Chiller and MCC Use.

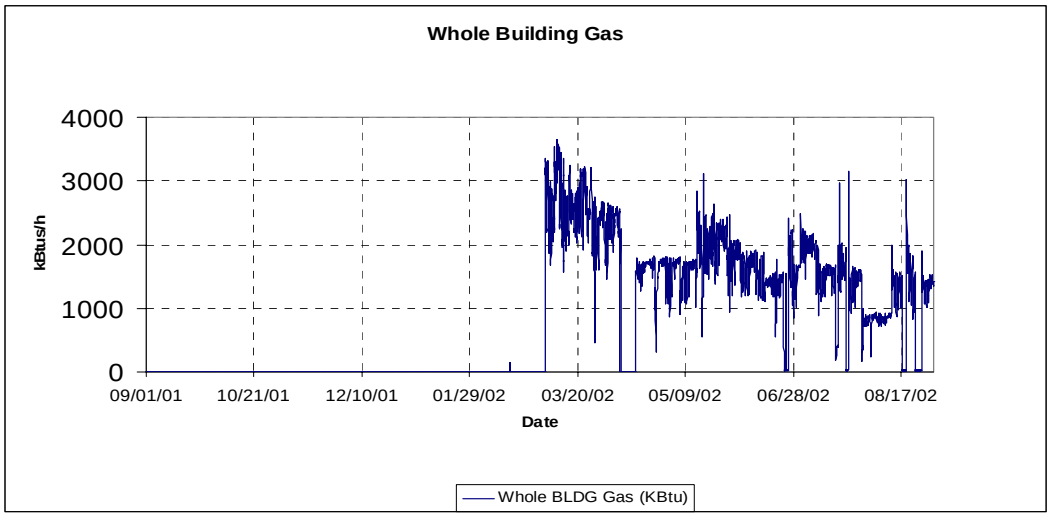


Figure 3.2-10: III Corp Natural Gas Use

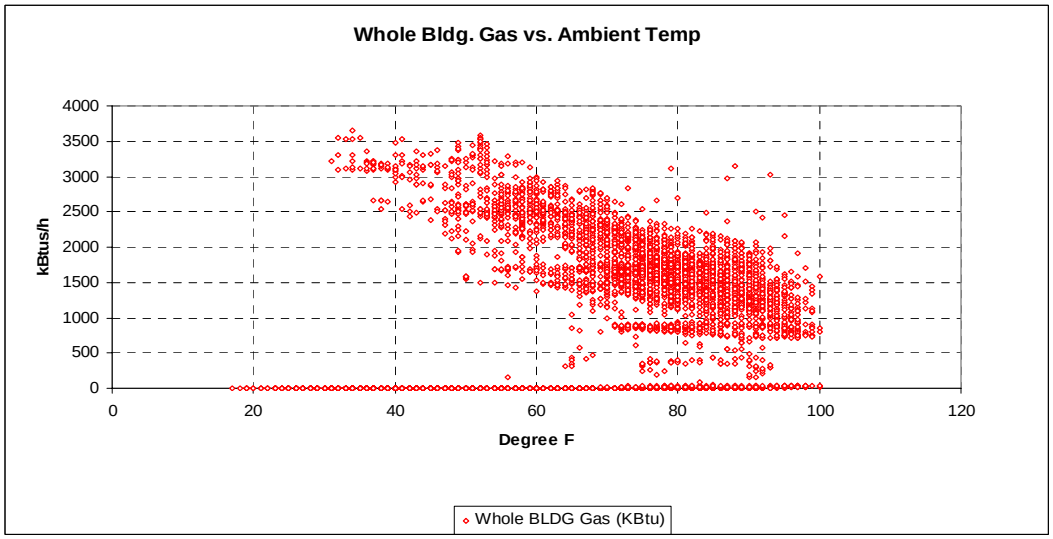


Figure 3.2-11: III Corp Natural Gas Use vs Temperature.

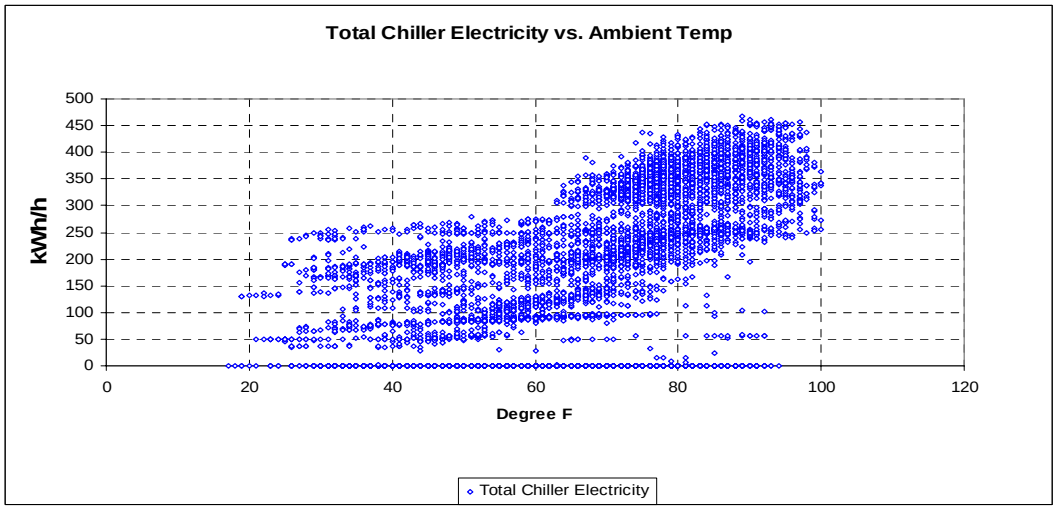
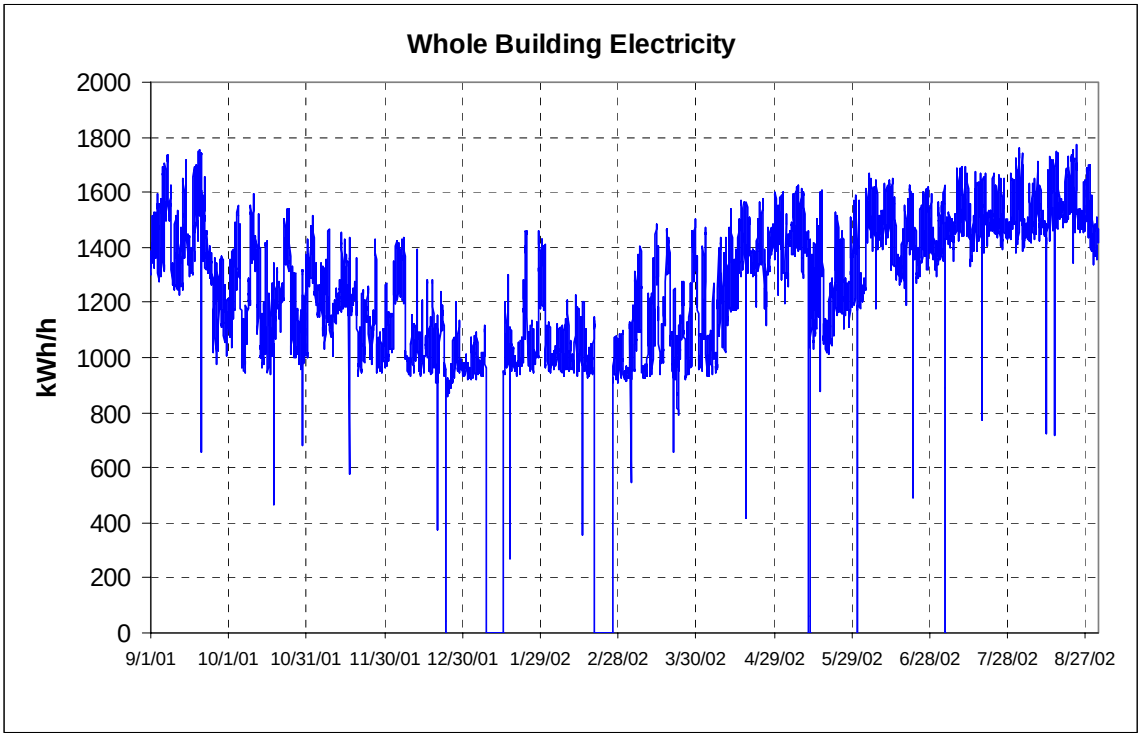


Figure 3.2-12: III Corp Chiller Electricity Use vs Temperature.



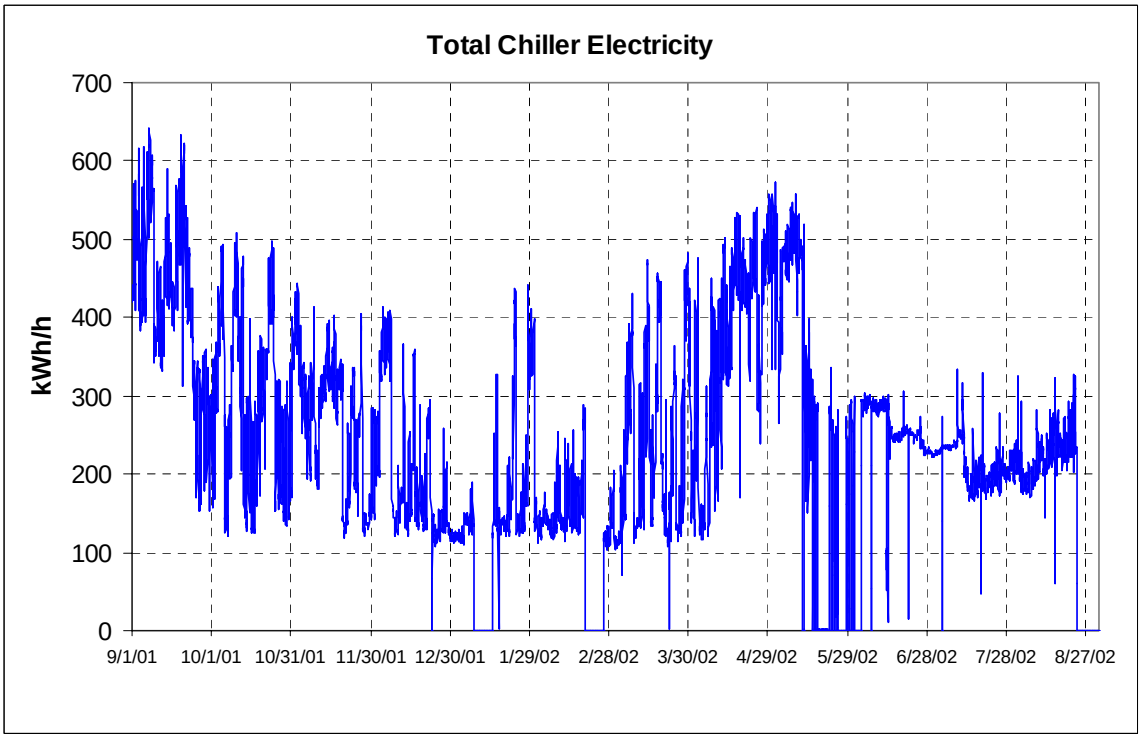


Figure 3.2-13: Darnall Hospital Electricity Use: Total and Chiller Use.

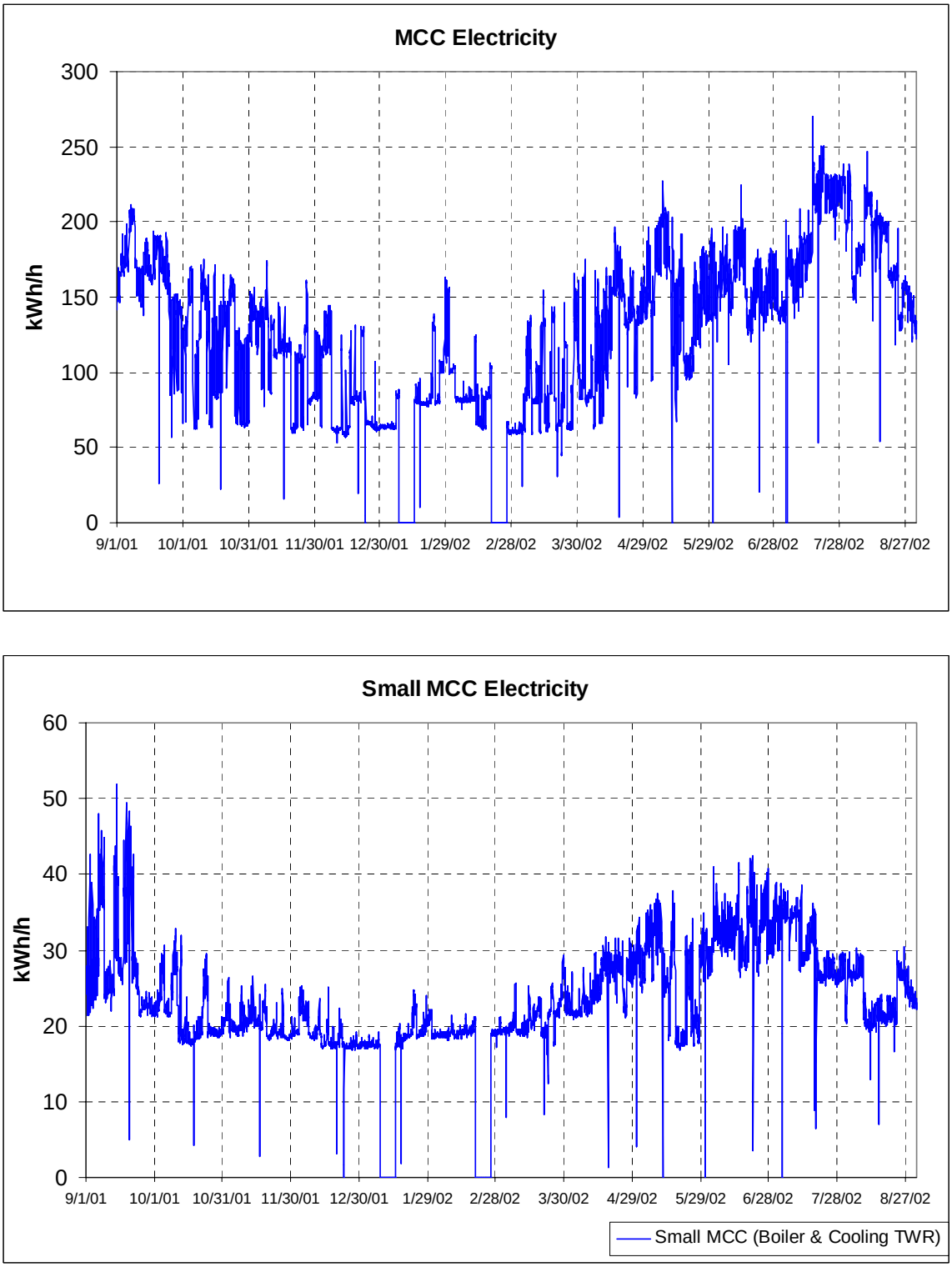


Figure 3.2-14: Darnall Hospital Electricity Use: MCC and Small MCC Use.

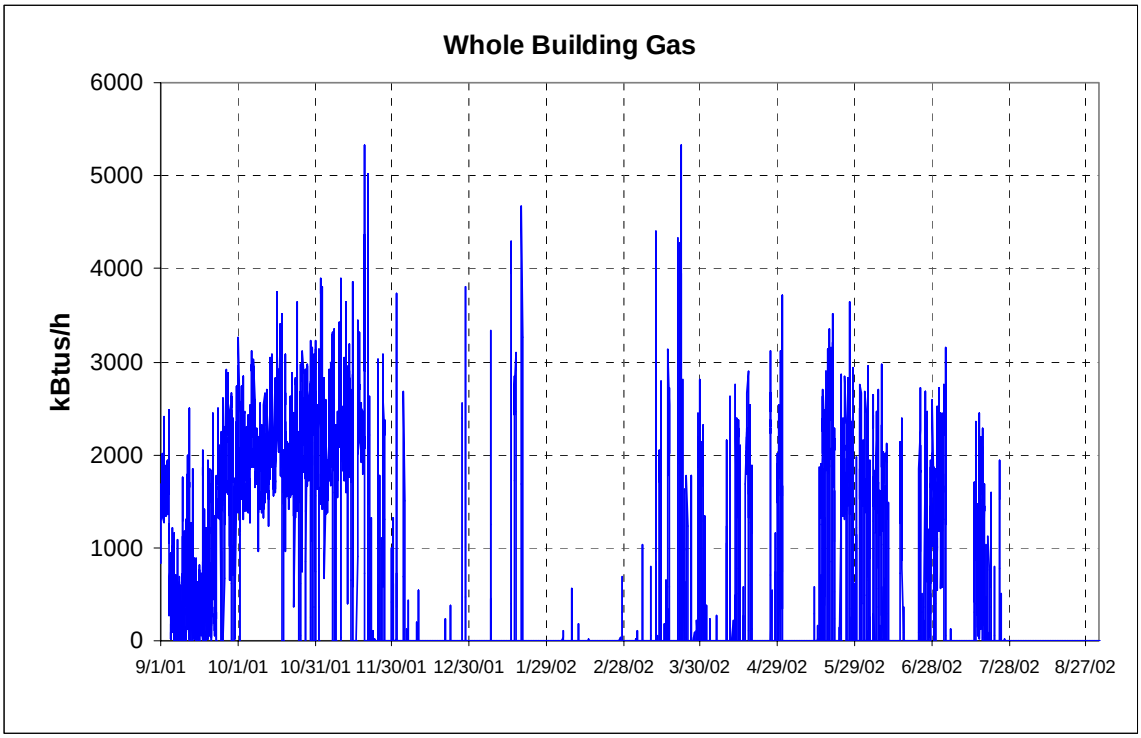


Figure 3.2-15: Darnall Hospital Natural Gas Use .

4. ANALYSIS OF THE CHILLER PERFORMANCE

4.1. Chiller performance using kW/ton curves

In this section an analysis of the chiller performance is presented, which utilizes tri-quadratic curve-fits to characterize the chiller performance. The coefficients of these tri-quadratic curve fits can be used in later periods to determine if there has been a degradation in chiller performance.

In Figure 4.1-1 a time series plot is shown of the kW/ton of both chillers and of chiller #1. Figure 4.1-2 shows a time series plot when chiller #2 was run and chillers #1 and #2 were run. Figure 4.1-3 through Figure 4.1-6 shows various kW/ton plots versus the tonnage of chilled water produced. Figure 4.1-3 shows all the different periods. Figure 4.1-4 shows data when only chiller #1 was being run. Figure 4.1-5 shows data when only chiller #2 was being run. Finally, Figure 4.1-6 shows periods when both chillers were run.

In Figure 4.1-3, at low loads, it is clear that the most efficient operation of the chillers is when chiller #1 runs. Chiller #2 appears to be slightly less efficient. Chiller #1 and #2 are roughly equal in efficiency at higher loads. Clearly, operating both chillers is much less efficient than operating one chiller (if the loads can be met).

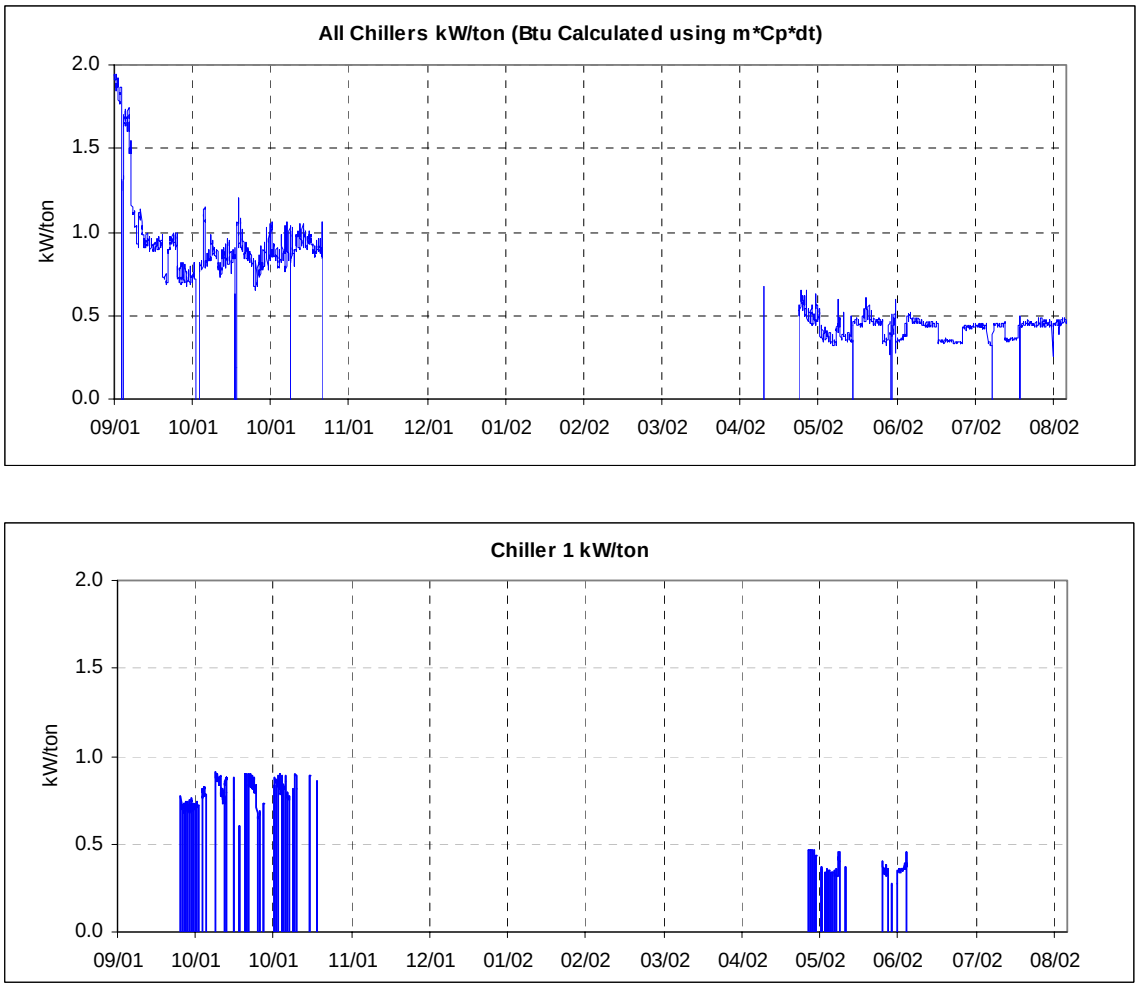


Figure 4.1-1: 87000 Block Thermal Plant Chiller Performance: All Data & Chiller #1.

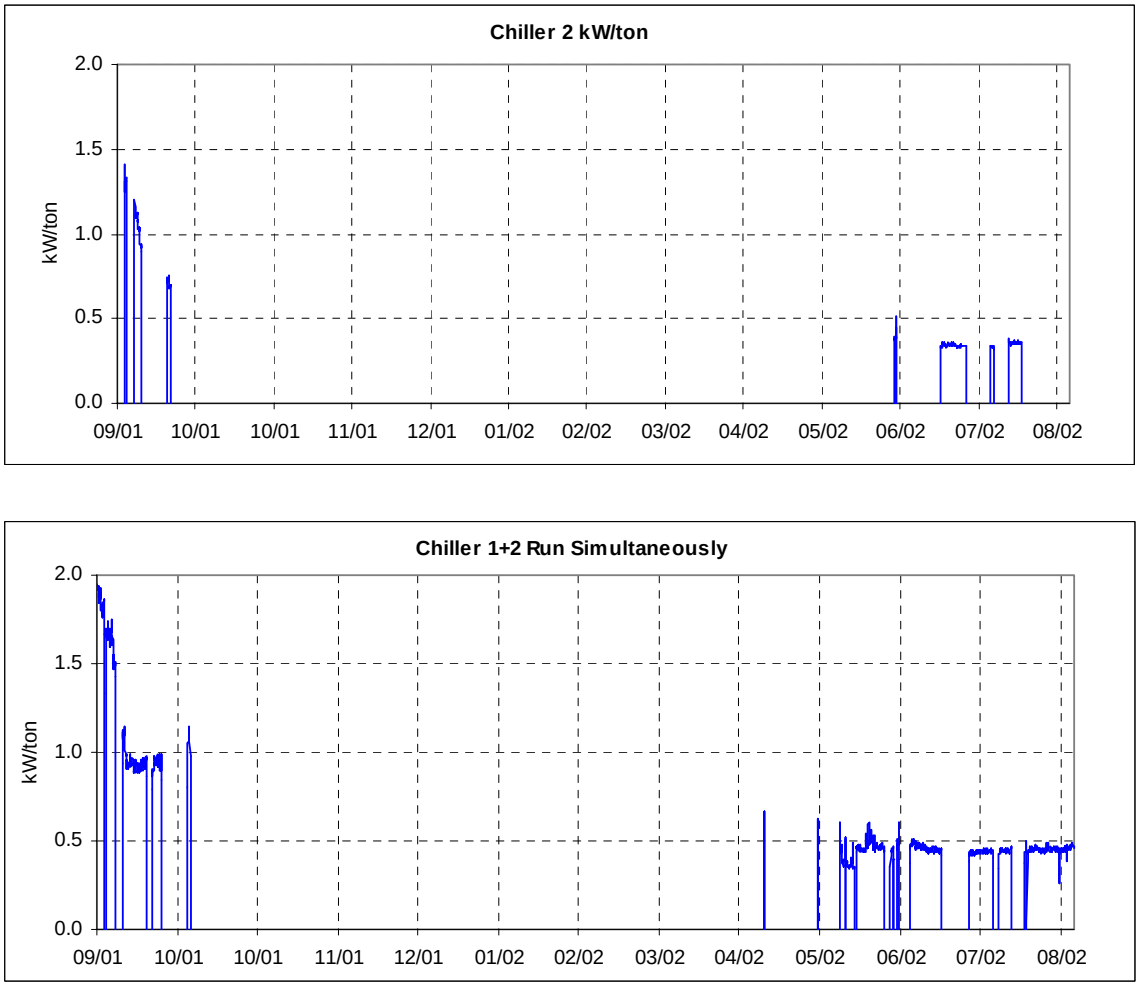


Figure 4.1-2: 87000 Block Thermal Plant Chiller Performance: Chiller #2 and periods when both chillers were running.

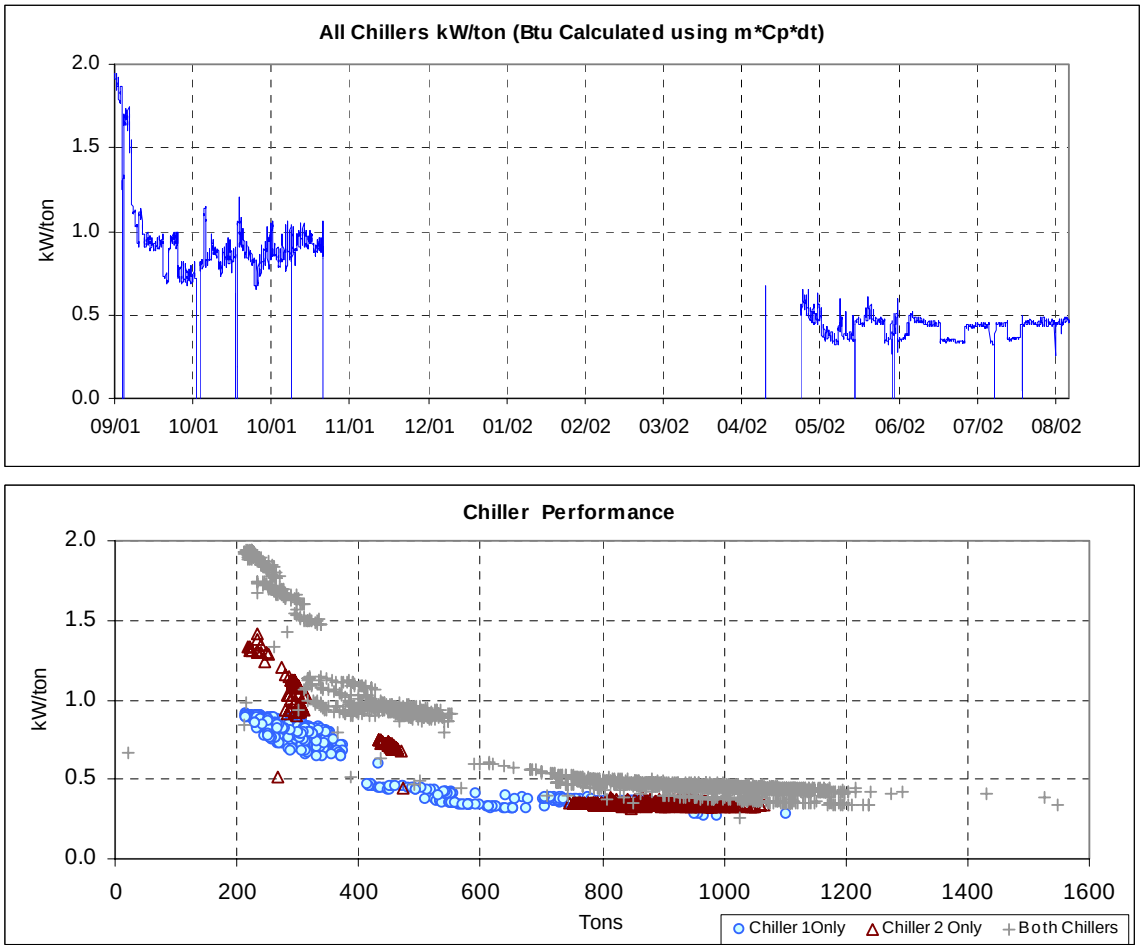


Figure 4.1-3: 87000 Block Thermal Plant Chiller Performance: All chiller data as a time series and as a kW/ton vs tonnage plot.

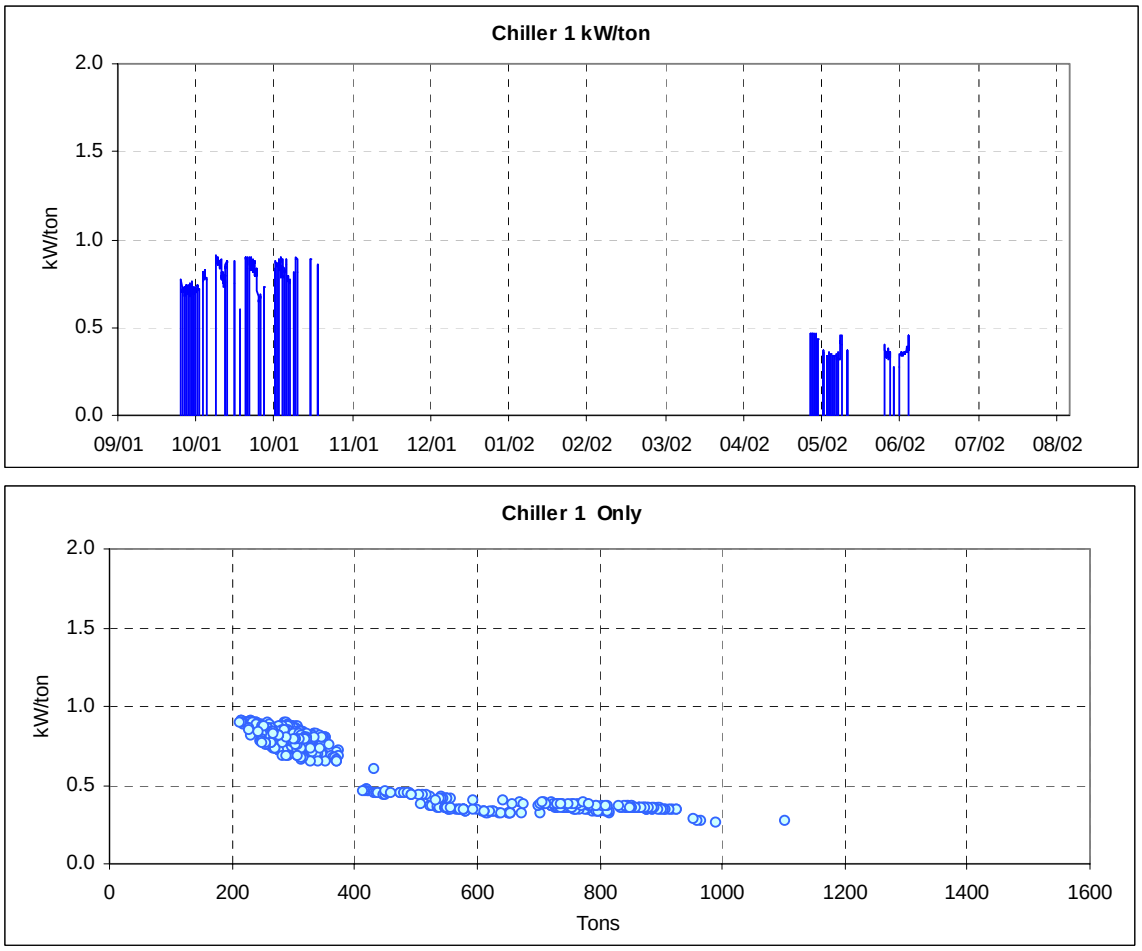


Figure 4.1-4: 87000 Block Thermal Plant Chiller Performance: Chiller #1 performance data as a time series and as a kW/ton vs tonnage plot.

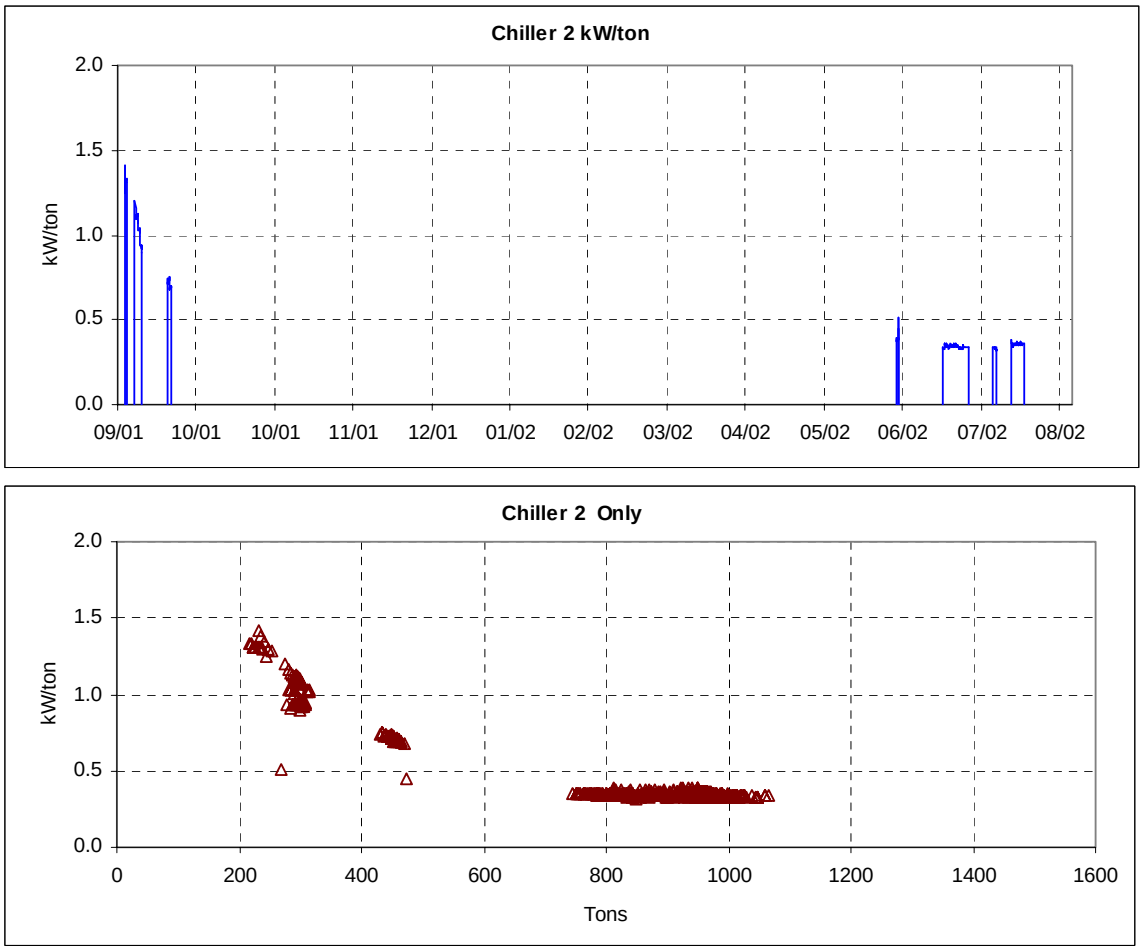


Figure 4.1-5: 87000 Block Thermal Plant Chiller Performance: Chiller #2 performance data as a time series and as a kW/ton vs tonnage plot.

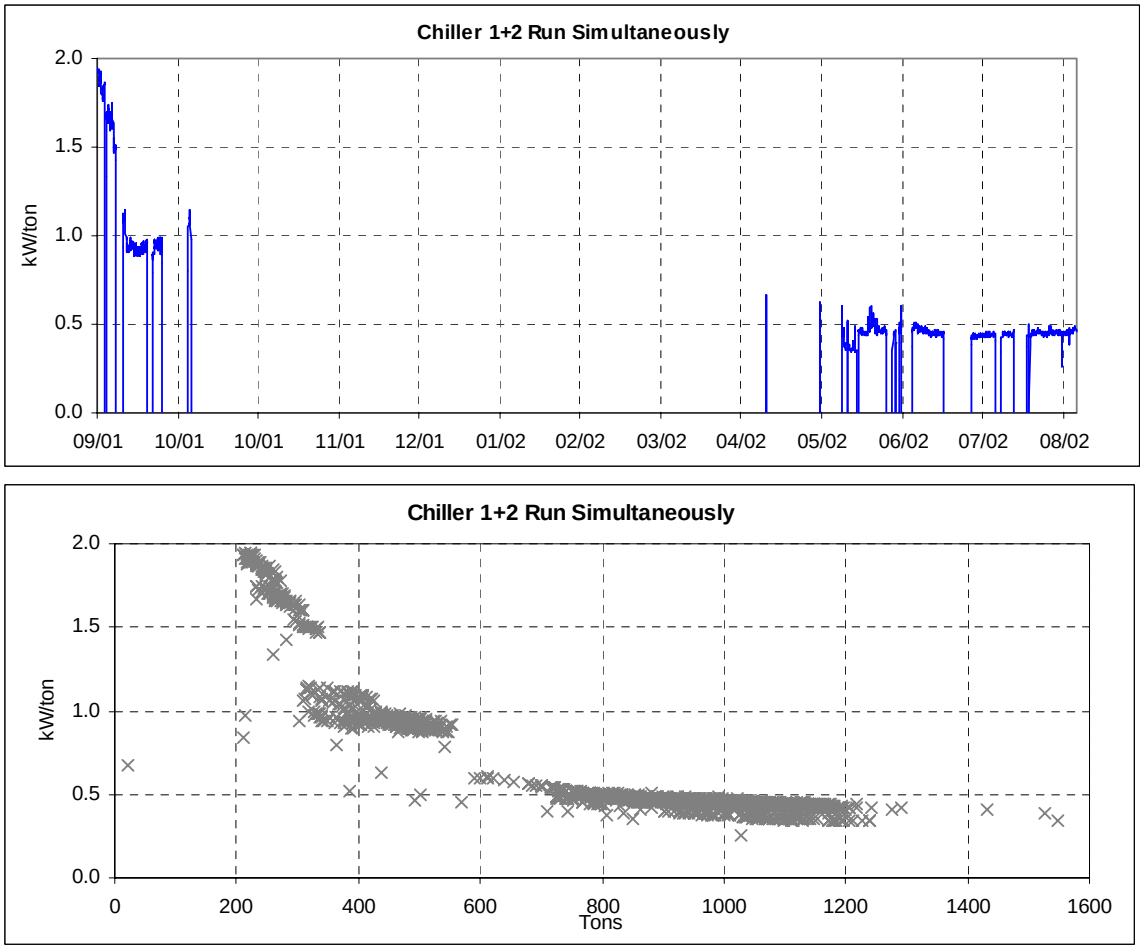


Figure 4.1-6: 87000 Block Thermal Plant Chiller Performance: Performance data for chiller #1 & #2 when both chillers operate as a time series and as a kW/ton vs tonnage plot.

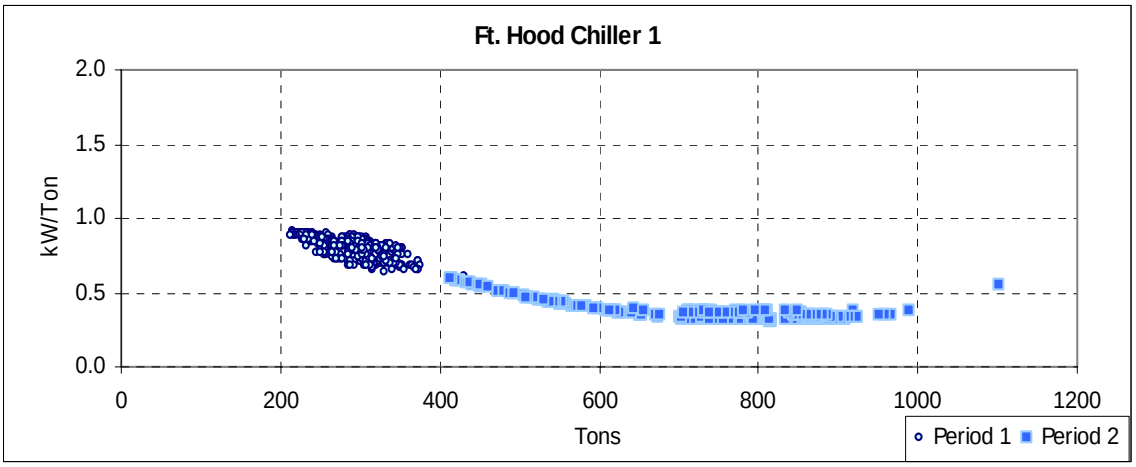
4.2. Quadratic Models of Chiller Analysis

In this section, regression models of the chiller performance are developed using the quadratic functional form outlined in the DOE-2 energy simulation program to model part-load equipment and plant performance characteristics (Haberl et al. 1997, LBNL, 1980, 1981, 1982, 1989).

To model the chiller efficiency the following tri-quadratic model was used:

Quadratic: kW/ton = a + b x Tons + c x Tcond + d x Tevap + e x Tons^2 + f x Tcond^2
+ g x Tevap^2 + h x Tons x Tcond + I x Tevap x Tons
+ j x Tcond x Tevap + k x Tons x Tcond x Tevap.

In the tables provided for each chiller the regressed coefficients for coefficients a, b, c, d, e, and f are given. As mentioned previously, the coefficients for these models can be used to detect chiller degradation in future periods.



Regression Statistics

Multiple R	0.67025
R Square	0.44924
Adjusted R Square	0.44332
Standard Error	0.05215
Observations	471
Degrees of Freedom	470

		b	c	d	e	f
X Coefficient(s)	10.37603	0.00851	-0.4872	2.6E-06	0.00643	-0.0003
Std Err of Coef.	5.28392	0.00697	0.27795	2.3E-06	0.00366	0.00018

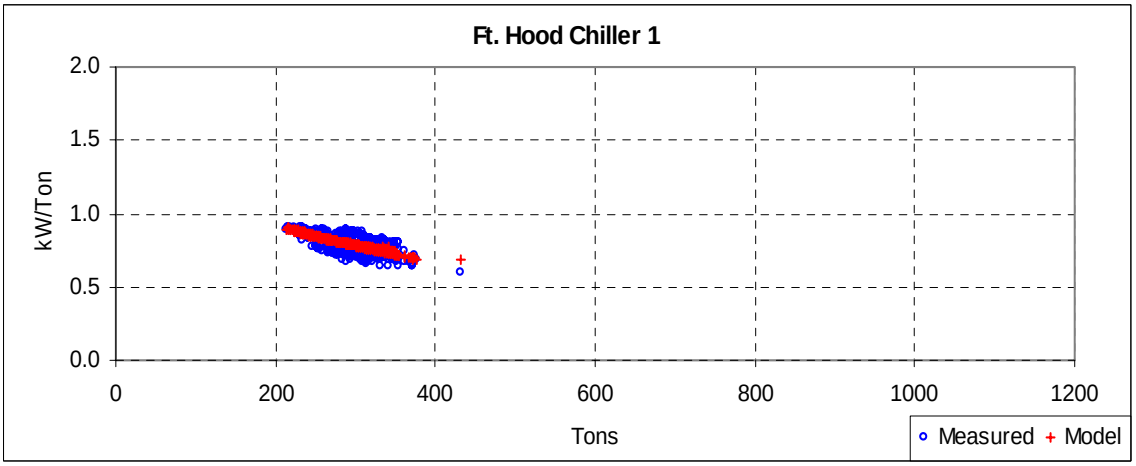
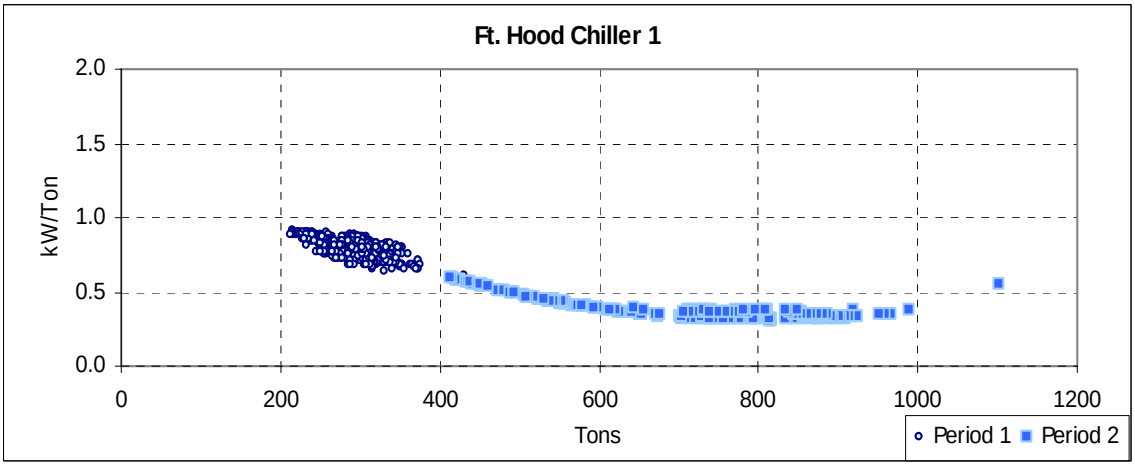


Figure 4.2-1: Quadratic analysis for chiller #1, period #1.



Regression Statistics	
Multiple R	0.76909
R Square	0.59149
Adjusted R Square	0.58242
Standard Error	0.02501
Observations	231
Degrees of Freedom	230

		b	c	d	e	f
X Coefficient(s)	1.507791	-0.0003	-0.0424	5.4E-07	0.00056	-1E-05
Std Err of Coef.	0.27768	0.00024	0.01218	7.7E-08	0.00015	5.3E-06

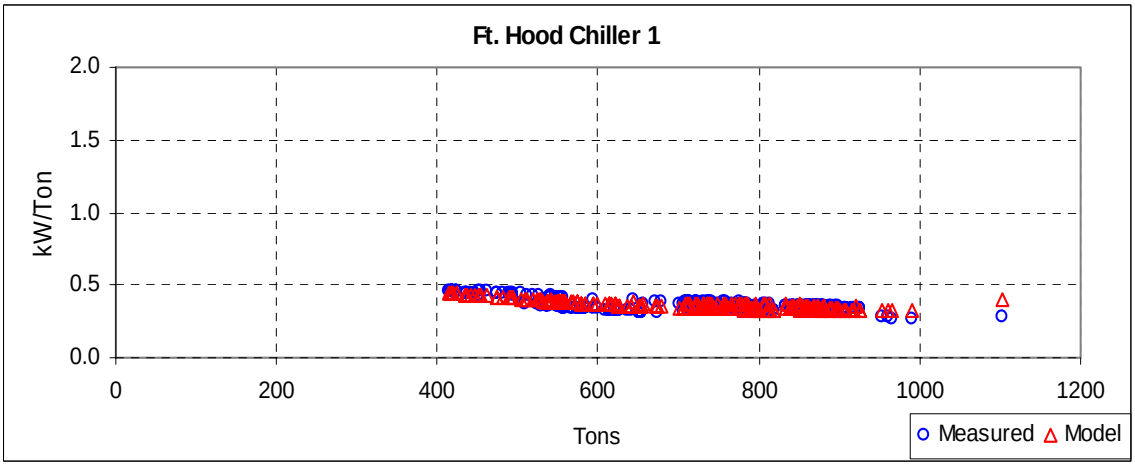
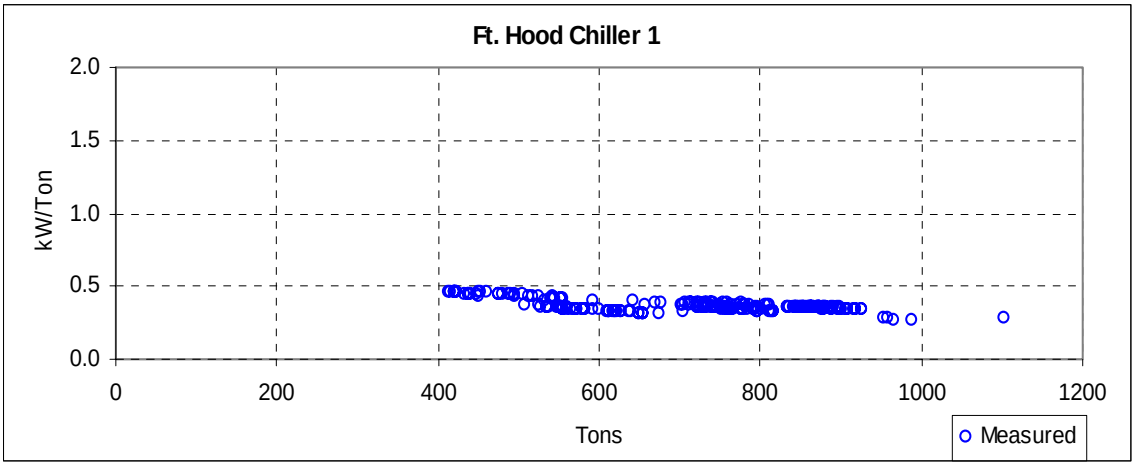


Figure 4.2-2: Quadratic analysis for chiller #1, period #2.



Regression Statistics

Multiple R	0.86661
R Square	0.75101
Adjusted R Square	0.73969
Standard Error	0.01974
Observations	231
Degrees of Freedom	230

	a	b	c	d	e	f
X Coefficient(s)	-45.121	0.07234	1.12447	0.41063	7.6E-07	0.00063
Std Err of Coef.	16.3312	0.0165	0.31032	0.25156	8.6E-08	0.00016
	g	h	I	j	k	
X Coefficient(s)	0.00213	-0.0014	-0.0009	-0.0145	1.8E-05	
Std Err of Coef.	0.00092	0.00036	0.00021	0.00385	4.5E-06	

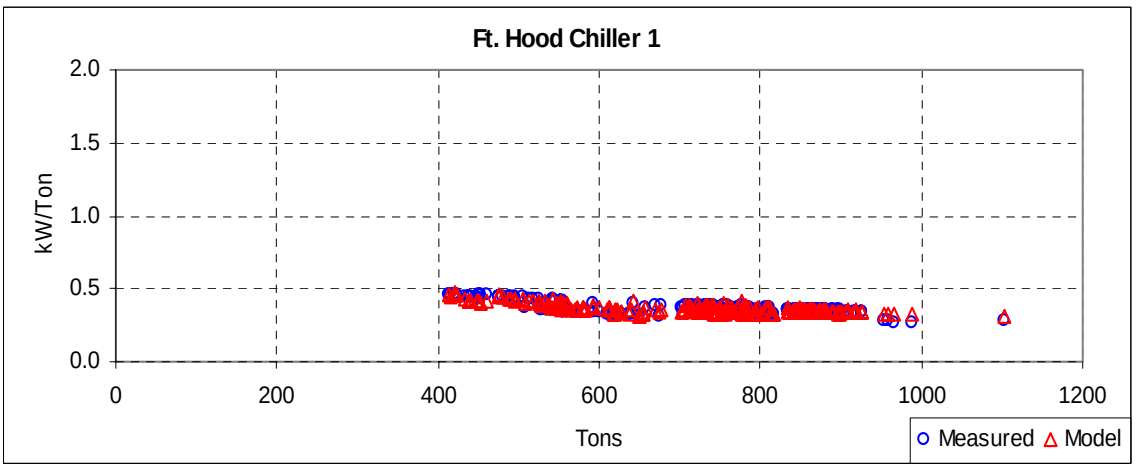
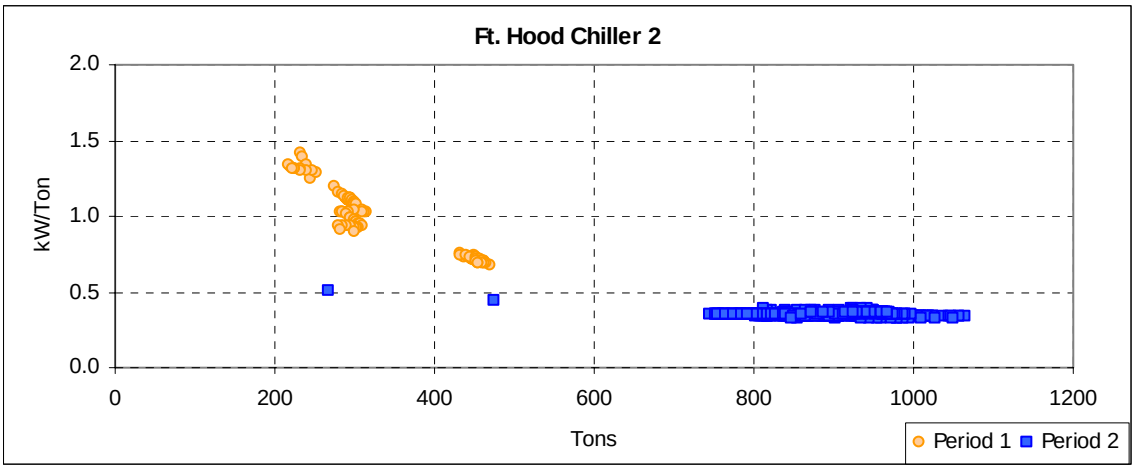


Figure 4.2-3: Triquadratic analysis for chiller #1.



Regression Statistics	
Multiple R	0.76909
R Square	0.59149
Adjusted R Square	0.58242
Standard Error	0.02501
Observations	231
Degrees of Freedom	230

		b	c	d	e	f
X Coefficient(s)	-11.8462	-0.0075	0.55145	1.3E-05	-0.0049	-9E-05
Std Err of Coef.	2.40468	0.00113	0.09691	8.5E-07	0.00098	2.5E-05

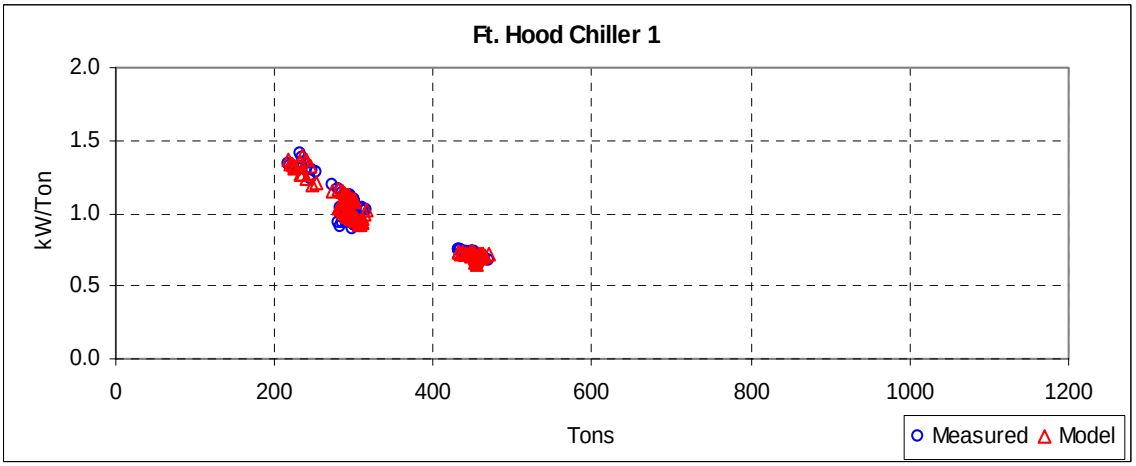
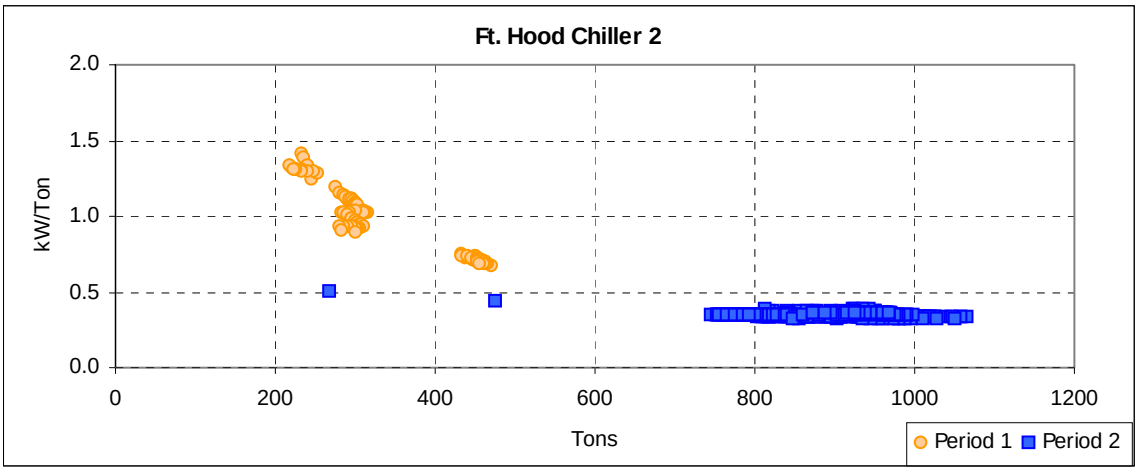


Figure 4.2-4: Quadratic analysis for chiller #2, Period #1.



Regression Statistics

Multiple R	0.67025
R Square	0.44924
Adjusted R Square	0.44332
Standard Error	0.05215
Observations	471
Degrees of Freedom	470

		b	c	d	e	f
X Coefficient(s)	8.837511	-0.0037	-0.298	6.6E-07	0.00268	5.7E-05
Std Err of Coef.	1.1935	0.00057	0.04189	7.1E-08	0.00036	1E-05

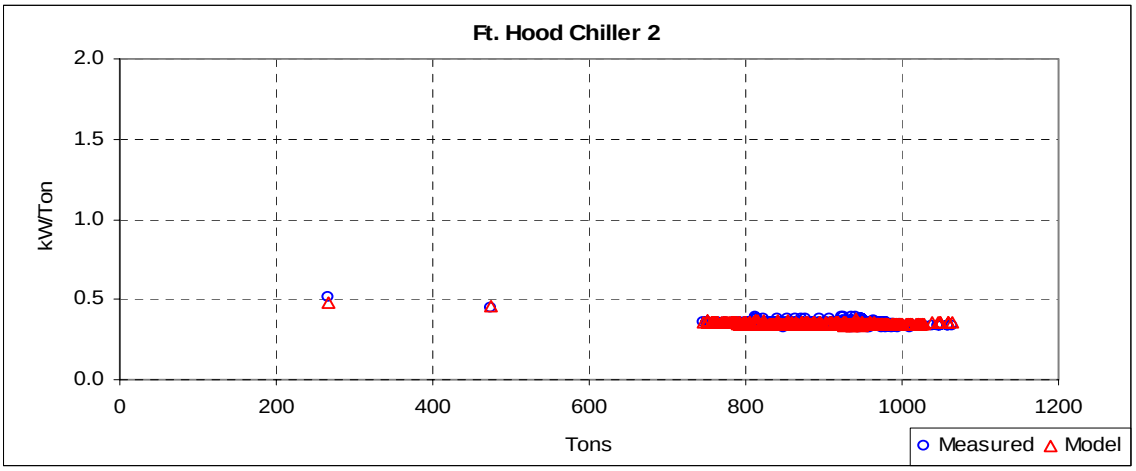
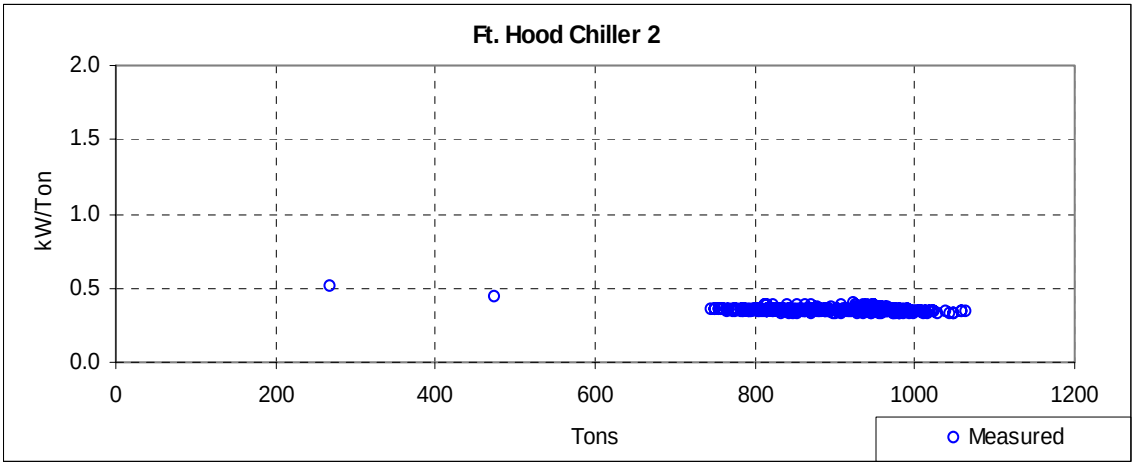


Figure 4.2-5: Quadratic analysis for chiller #2, period #2.



Regression Statistics

Multiple R	0.86661
R Square	0.75101
Adjusted R Square	0.73969
Standard Error	0.01974
Observations	231
Degrees of Freedom	230

		b	c	d	e	f
X Coefficient(s)	-248.15	0.29075	5.40889	3.17772	3.4E-07	0.00459
Std Err of Coef.	33.1128	0.03578	0.73941	0.40858	7.7E-08	0.00034
	g	h	I	j	k	
X Coefficient(s)	-5E-05	-0.0066	-0.0036	-0.0716	8.1E-05	
Std Err of Coef.	0.00025	0.00081	0.00043	0.00915	9.8E-06	

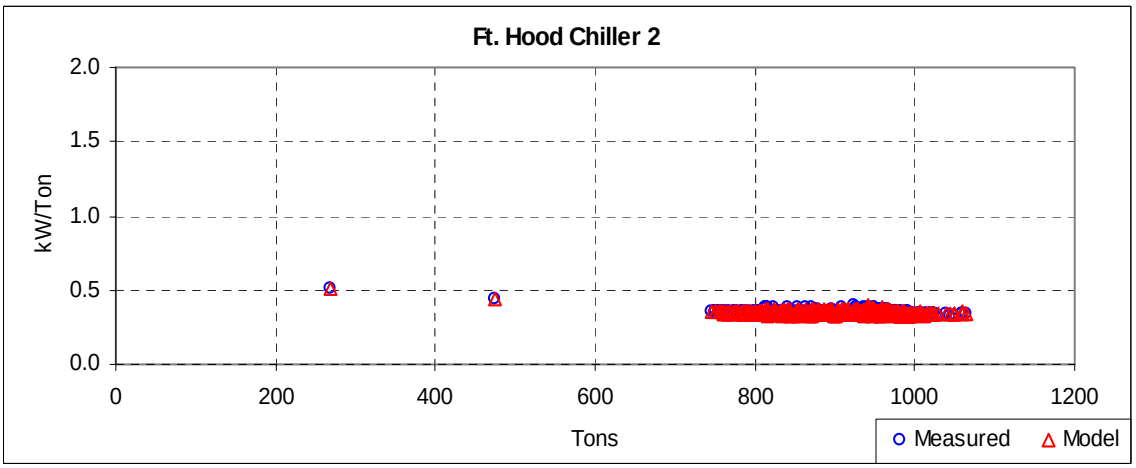


Figure 4.2-6: Triquadratic analysis for chiller #2.

5. BASELINE MODELS FOR WEATHER-DEPENDENT CHANNELS AT THE THERMAL PLANT.

In this section the regression analysis for the weather dependent channels of the thermal plant are presented.

In Table 5-1 and Figure 5-1 the weather-dependent model is shown for the daily natural gas use of the thermal plant. Unfortunately, since there was construction in the September 2001 to August 2002 period, the data for this model include data before the construction and after the construction. Hence, it is recommended that additional data be recorded and analyzed to obtain the appropriate baseline model that includes the impact of the replacement of the buried chilled water lines and steam lines.

In Table 5-2 and Figure 5-2 the weather-dependent model is shown for daily chilled water use of the 87000 block buildings. This model is moderately well described with an adjusted R2 of 0.54. In Table 5-3 and Figure 5-3 the weather-dependent model is shown for the chiller electricity use. This model is also moderately well described with an adjusted R2 of 0.68. In Table 5-4 and Figure 5-4 the daily electricity use of the pump has been modeled with a two parameter model, which is well described with an adjusted R2 of 0.65.

Table 5-1: Thermal Plant Natural Gas Weather-dependent Model (9/1/2001 to 8/31/2002).

Path and name of input data file = DailyModFH.prn
Value of no-data flag = -99
Column number of group field = 8
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable = 5
Number of independent X variables (0 to 6) = 2
Column number of independent variable X1 = 6
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0
****
ASHRAE INVERSE MODELING TOOLKIT (1.9)
****
Output file name = IMT.Out
****
Input data file name = DailyModFH.prn
Model type = Mean
Grouping column No = 8
Value for grouping = 1
Residual mode = 1
# of X(Indep.) Var = 0
Y1 column number = 5
X1 column number = 0 (unused)
X2 column number = 0 (unused)
X3 column number = 0 (unused)
X4 column number = 0 (unused)
X5 column number = 0 (unused)
X6 column number = 0 (unused)
****
Regression Results
N = 34
Ymean = 13.599
StdDev = 1.706
CV-StDev = 12.543 %

```
Path and name of input data file = DailyModFH.prn
Value of no-data flag = -99
Column number of group field = 8
Value of valid group field = 2
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable = 5
Number of independent X variables (0 to 6)  = 2
Column number of independent variable X1 = 6
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  DailyModFH.prn
    Model type =           Mean
    Grouping column No =    8
    Value for grouping =    2
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      5
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    130
       Ymean =     4.687
      StdDev =     0.746
    CV-StDev =    15.909 %
```

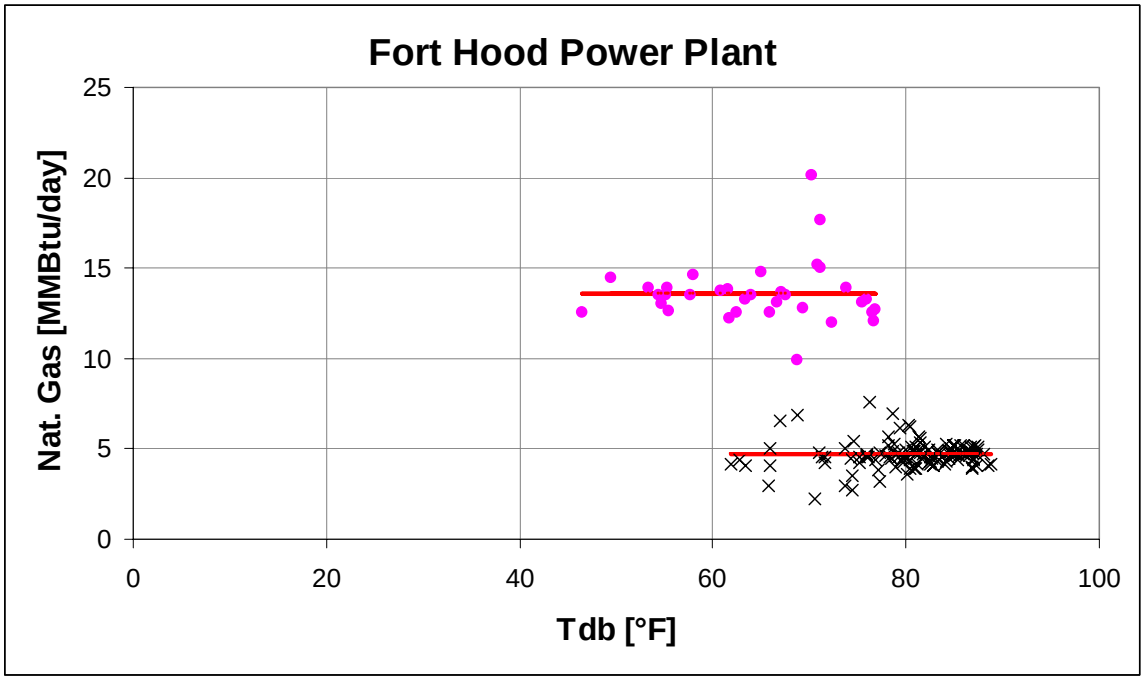


Figure 5-1: Thermal Plant Natural Gas Weather-dependent Model (9/1/2001 to 8/31/2002).

Table 5-2: Chilled Water Weather-dependent Model.

```
Path and name of input data file = DailyModFH.prn
Value of no-data flag = -99
Column number of group field = 8
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable = 3
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 2
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  DailyModFH.prn
    Model type =           3P Cooling
    Grouping column No =    8
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      3
    X1 column number =   2
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     78
          R2 =     0.544
       AdjR2 =     0.544
        RMSE =     19.9738
     CV-RMSE =    25.805%
           p =     0.814
          DW =     0.401 (p>0)
          N1 =      1
          N2 =     77
         Ycp =     25.5800 (      5.8981)
          LS =      0.0000 (      0.0000)
          RS =      2.6287 (      0.2763)
         Xcp =     49.0067 (      0.7517)
```

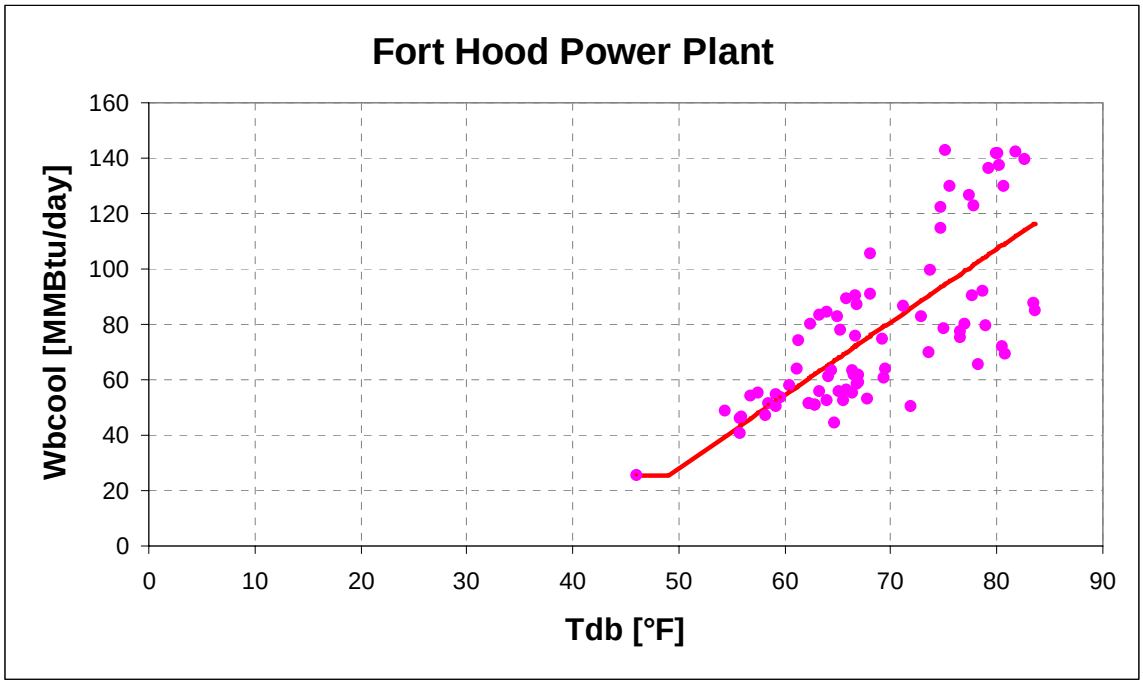


Figure 5-2: Chilled Water Weather-dependent Model.

Table 5-3: Chiller Electricity Use Weather-dependent Model.

Path and name of input data file = DailyModFH.prn
Value of no-data flag = -99
Column number of group field = 8
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable = 4
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 2
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  DailyModFH.prn
    Model type =           3P Cooling
    Grouping column No =    8
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      4
    X1 column number =   2
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     55
          R2 =     0.685
       AdjR2 =     0.685
        RMSE =   1218.6855
     CV-RMSE =    19.516%
           p =     0.514
          DW =     0.973 (p>0)
          N1 =      2
          N2 =     53
         Ycp =   3107.9565 (    335.2854)
          LS =      0.0000 (      0.0000)
          RS =    214.7162 (     20.0066)
         Xcp =     56.1275 (      0.5842)
```

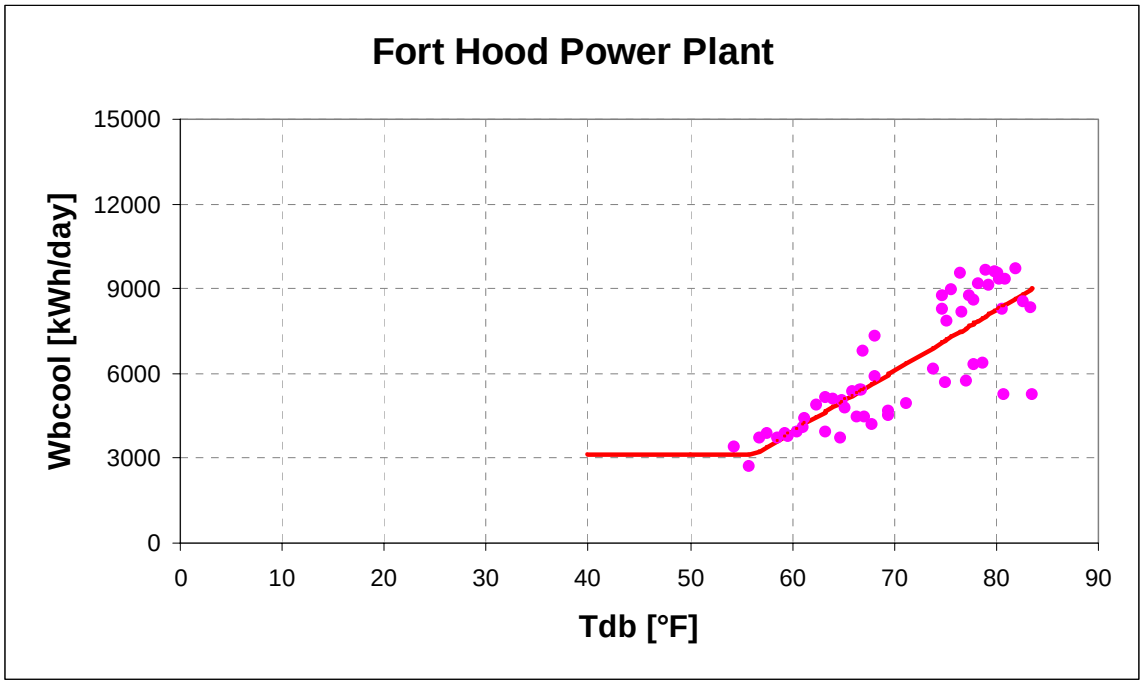


Figure 5-3: Chiller Electricity Use Weather-dependent Model.

Table 5-4: Chiller Misc Loads Model.

Path and name of input data file = DailyModFH.prn
Value of no-data flag = -99
Column number of group field = 8
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 2
Column number of dependent Y variable = 6
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 2
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  DailyModFH.prn
    Model type =           2P
    Grouping column No =    8
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      6
    X1 column number =   2
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     76
          R2 =     0.653
       AdjR2 =     0.653
        RMSE =     69.9825
     CV-RMSE =     2.007%
           p =     0.199
          DW =     1.473 (p>0)
           a =   2668.1084 (     69.9315)
          X1 =     11.8893 (      1.0077)
```

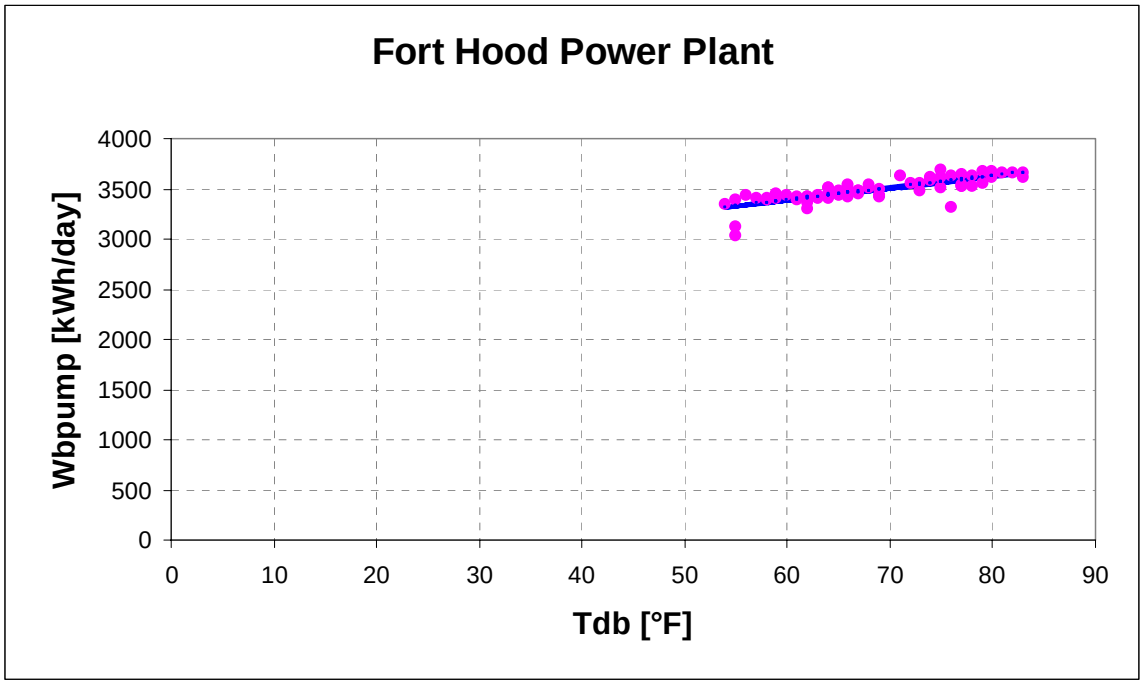


Figure 5-4: Chiller Misc Loads Model.

6. BASELINE MODELS FOR WEATHER-DEPENDENT CHANNELS AT THE III CORP BUILDING

In this section of the report the baseline models are presented for the III Corp building. In Table 6-1, Table 6-2, Figure 6-1 and Figure 6-2 the weekday/weekend models are presented for the building's electricity use that is considered to be weather-independent.

In Table 6-3 and Figure 6-3 the three-parameter model is presented for the building's chiller electricity use. In Table 6-4 and Figure 6-4 the three-parameter model is presented for the building's MCC electricity use. In Table 6-5 and Figure 6-5 the three-parameter model is presented for the building's natural gas use.

Table 6-1: Weekday, Weather Independent Model for III Corp Building

```
Path and name of input data file =IIICorp01.prn
Value of no-data flag = -99
Column number of group field = 8
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =5
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 6
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

*********************************************
 ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *********************************************
  Output file name = IMT.Out
 *********************************************
  Input data file name = IIICorp01.prn
  Model type =          Mean
  Grouping column No =    8
  Value for grouping =    1
  Residual mode =         1
  # of X(Indep.) Var =    0
  Y1 column number =      5
  X1 column number =   0 (unused)
  X2 column number =   0 (unused)
  X3 column number =   0 (unused)
  X4 column number =   0 (unused)
  X5 column number =   0 (unused)
  X6 column number =   0 (unused)
 *********************************************
  Regression Results
  ----------------------------------
        N =    158
  ----------------------------------
     Ymean = 13477.816
  ----------------------------------
    StdDev =  1292.158
  ----------------------------------
  CV-StDev =     9.587 %
  ----------------------------------
```

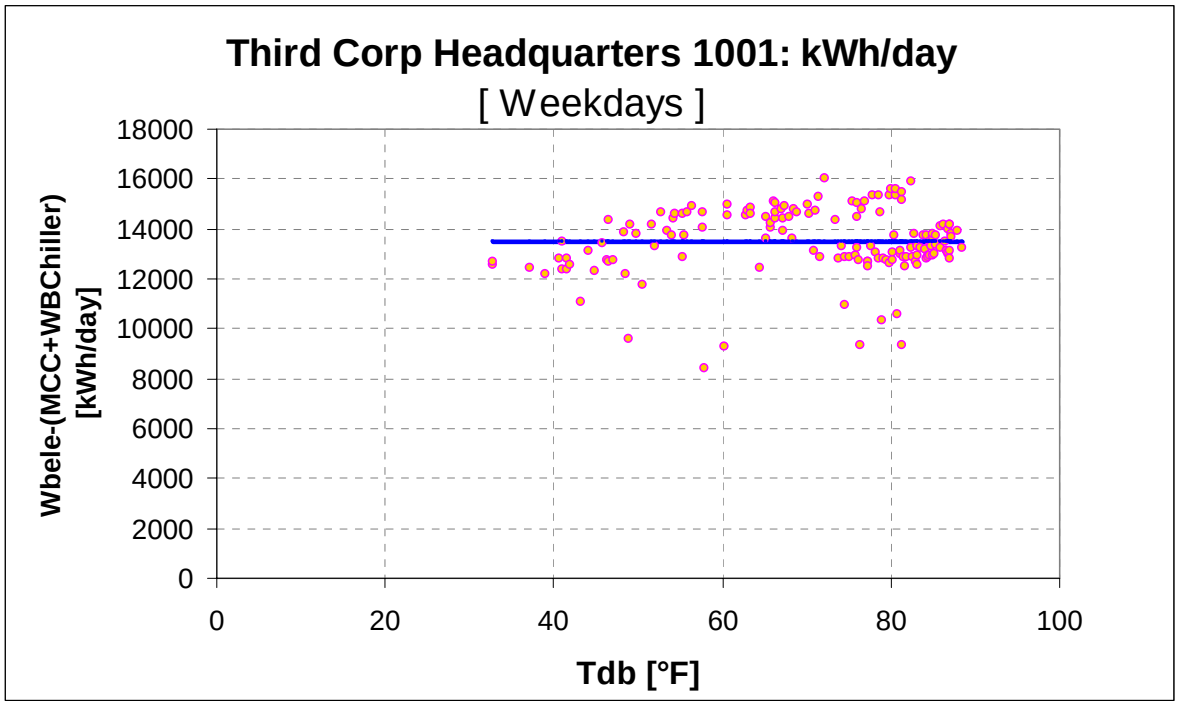


Figure 6-1: Weekday, Weather Independent Model for III Corp Building

Table 6-2: Weekend, Weather Independent Model for III Corp Building

```
Path and name of input data file =IIICorp01.prn
Value of no-data flag = -99
Column number of group field = 8
Value of valid group field = 2
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =5
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 6
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

*******************************************
 ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *******************************************
  Output file name = IMT.Out
 *******************************************
  Input data file name = IIICorp01.prn
  Model type =          Mean
  Grouping column No =    8
  Value for grouping =    2
  Residual mode =         1
  # of X(Indep.) Var =    0
  Y1 column number =      5
  X1 column number =   0 (unused)
  X2 column number =   0 (unused)
  X3 column number =   0 (unused)
  X4 column number =   0 (unused)
  X5 column number =   0 (unused)
  X6 column number =   0 (unused)
 *******************************************
  Regression Results
  ----------------------------------------
        N =     65
  ----------------------------------------
     Ymean =  9983.989
  ----------------------------------------
    StdDev =  1258.299
  ----------------------------------------
  CV-StDev =    12.603 %
  ----------------------------------------
```

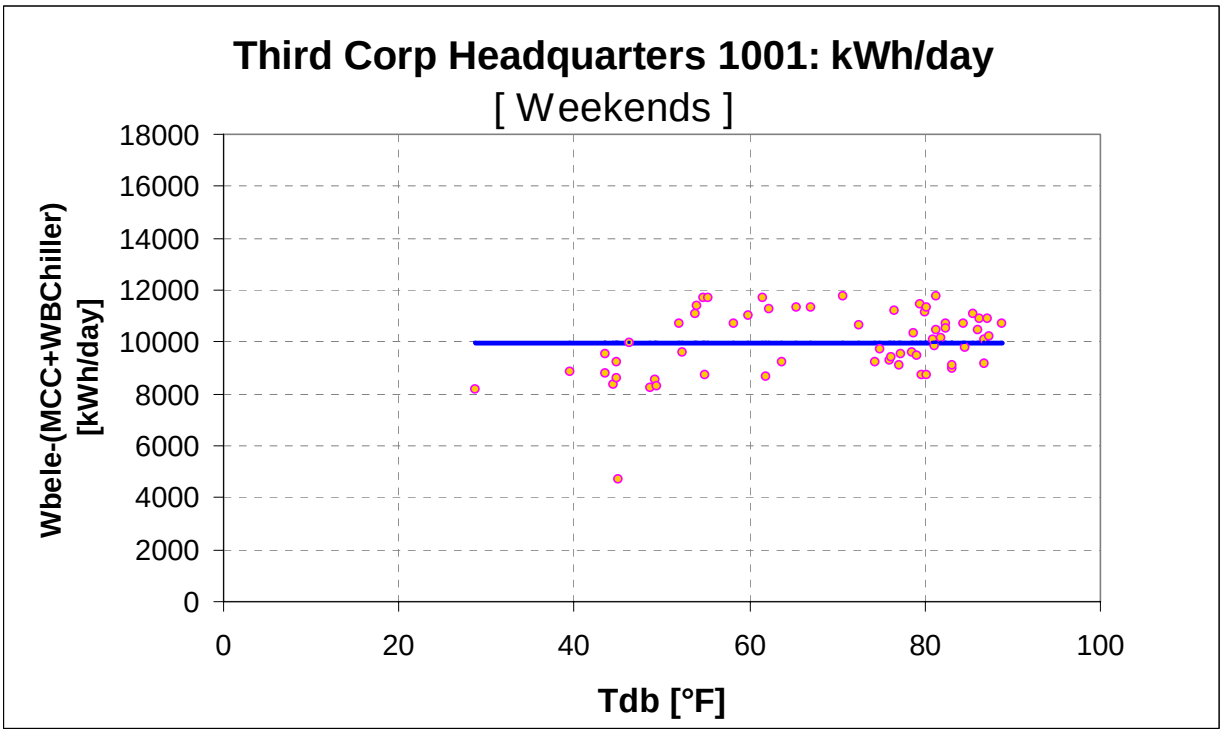


Figure 6-2: Weekend, Weather Independent Model for III Corp Building for III Corp

Table 6-3: Whole-building Chiller Electricity Use Model for III Corp

```
Path and name of input data file =IIICorp01.prn
Value of no-data flag = -99
Column number of group field = 9
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable =2
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 6
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

*********************************************
 ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *********************************************
  Output file name = IMT.Out
 *********************************************
  Input data file name = IIICorp01.prn
  Model type =          3P Cooling
  Grouping column No =    9
  Value for grouping =    1
  Residual mode =         1
  # of X(Indep.) Var =    1
  Y1 column number =      2
  X1 column number =   6
  X2 column number =   0 (unused)
  X3 column number =   0 (unused)
  X4 column number =   0 (unused)
  X5 column number =   0 (unused)
  X6 column number =   0 (unused)
 *********************************************
  Regression Results
  ----------------------------------
        N =    218
  ----------------------------------
       R2 =     0.646
  ----------------------------------
     AdjR2 =     0.646
  ----------------------------------
      RMSE =   1447.5609
  ----------------------------------
   CV-RMSE =    24.656%
  ----------------------------------
        p =     0.856
  ----------------------------------
```

DW = 0.289 (p>0)

N1 = 63

N2 = 155

Ycp = 3479.5752 (155.2095)

LS = 0.0000 (0.0000)

RS = 198.0775 (9.9660)

Xcp = 61.1868 (1.1984)

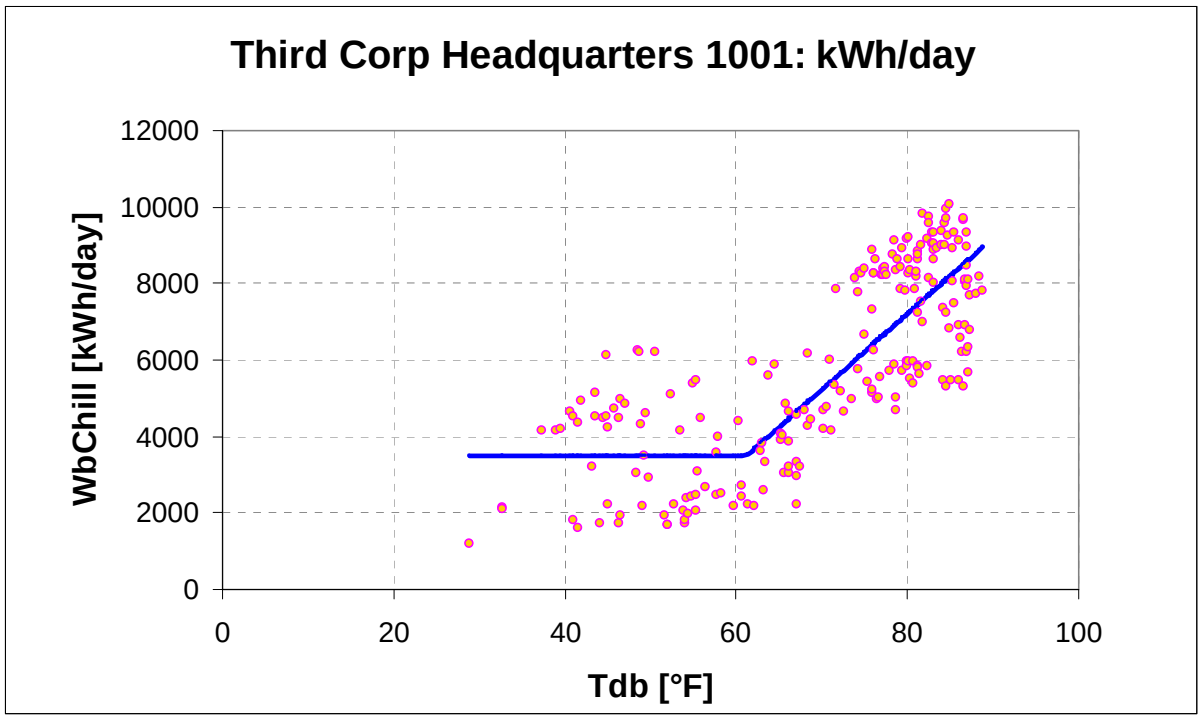


Figure 6-3: Whole-building Chiller Electricity Use Model

Table 6-4: Whole-building MCC Electricity Use Model for III Corp

```
Path and name of input data file =IIICorp01.prn
Value of no-data flag = -99
Column number of group field = 9
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable =3
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 6
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

*******************************************
 ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *******************************************
  Output file name = IMT.Out
 *******************************************
  Input data file name = IIICorp01.prn
  Model type =          3P Cooling
  Grouping column No =    9
  Value for grouping =    1
  Residual mode =         1
  # of X(Indep.) Var =    1
  Y1 column number =      3
  X1 column number =   6
  X2 column number =   0 (unused)
  X3 column number =   0 (unused)
  X4 column number =   0 (unused)
  X5 column number =   0 (unused)
  X6 column number =   0 (unused)
 *******************************************
  Regression Results
  ----------------------------------------
        N =    218
  ----------------------------------------
       R2 =     0.488
  ----------------------------------------
    AdjR2 =     0.488
  ----------------------------------------
     RMSE =    399.3762
  ----------------------------------------
   CV-RMSE =    15.042%
  ----------------------------------------
        p =     0.768
  ----------------------------------------
       DW =     0.472 (p>0)
```

N1 = 85

N2 = 133

Ycp = 2244.6348 (39.3872)

LS = 0.0000 (0.0000)

RS = 51.0125 (3.5582)

Xcp = 67.1788 (1.1984)

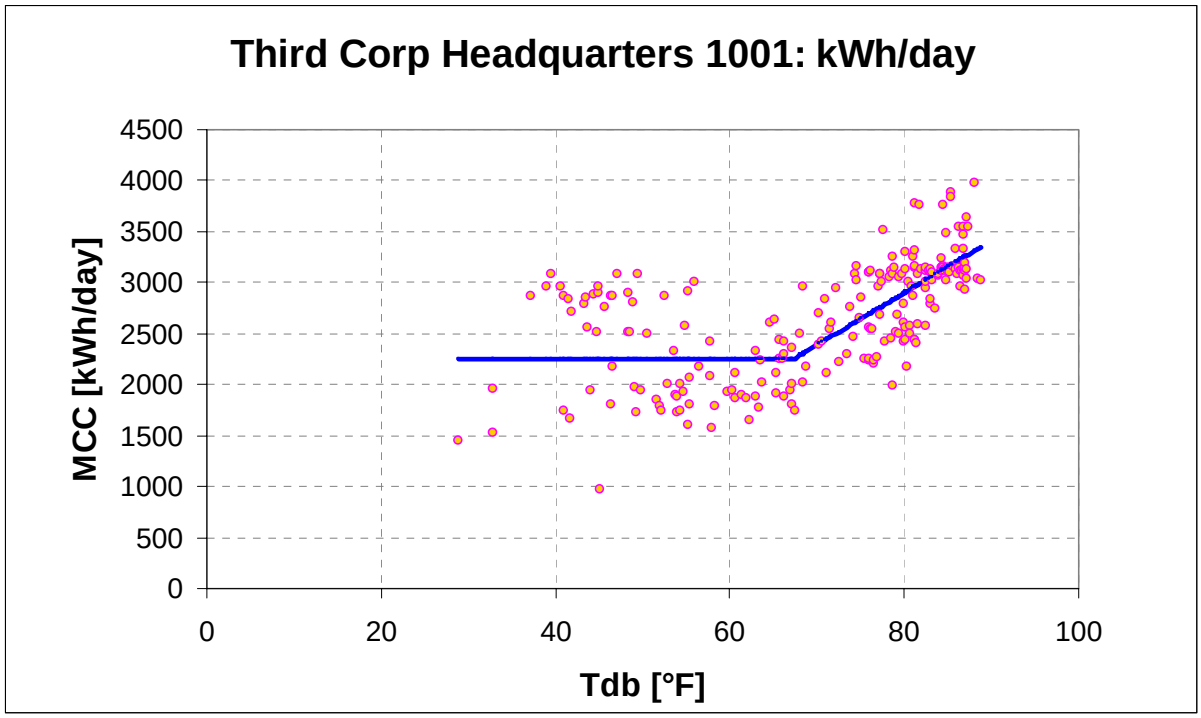


Figure 0-1: Whole-building Model for MCC Electricity Use.

Table 0-1: Whole-building Natural Gas Use Model for III Corp

```
Path and name of input data file =IIICorp02.prn
Value of no-data flag = -99
Column number of group field = 9
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable =4
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 6
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

*******************************************
 ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *******************************************
  Output file name = IMT.Out
 *******************************************
  Input data file name = IIICorp02.prn
  Model type =          3P Heating
  Grouping column No =    9
  Value for grouping =    1
  Residual mode =         1
  # of X(Indep.) Var =    1
  Y1 column number =      4
  X1 column number =   6
  X2 column number =   0 (unused)
  X3 column number =   0 (unused)
  X4 column number =   0 (unused)
  X5 column number =   0 (unused)
  X6 column number =   0 (unused)
 *******************************************
  Regression Results
  ---------------------------------------
        N =    169
  ---------------------------------------
       R2 =     0.664
  ---------------------------------------
     AdjR2 =     0.664
  ---------------------------------------
      RMSE =   8541.3643
  ---------------------------------------
   CV-RMSE =    21.451%
  ---------------------------------------
        p =     0.607
  ---------------------------------------
       DW =     0.785 (p>0)
```

N1 = 166

N2 = 3

Ycp = 26046.1367 (1002.8143)

LS = -1137.1708 (62.5563)

RS = 0.0000 (0.0000)

Xcp = 87.7958 (0.9542)

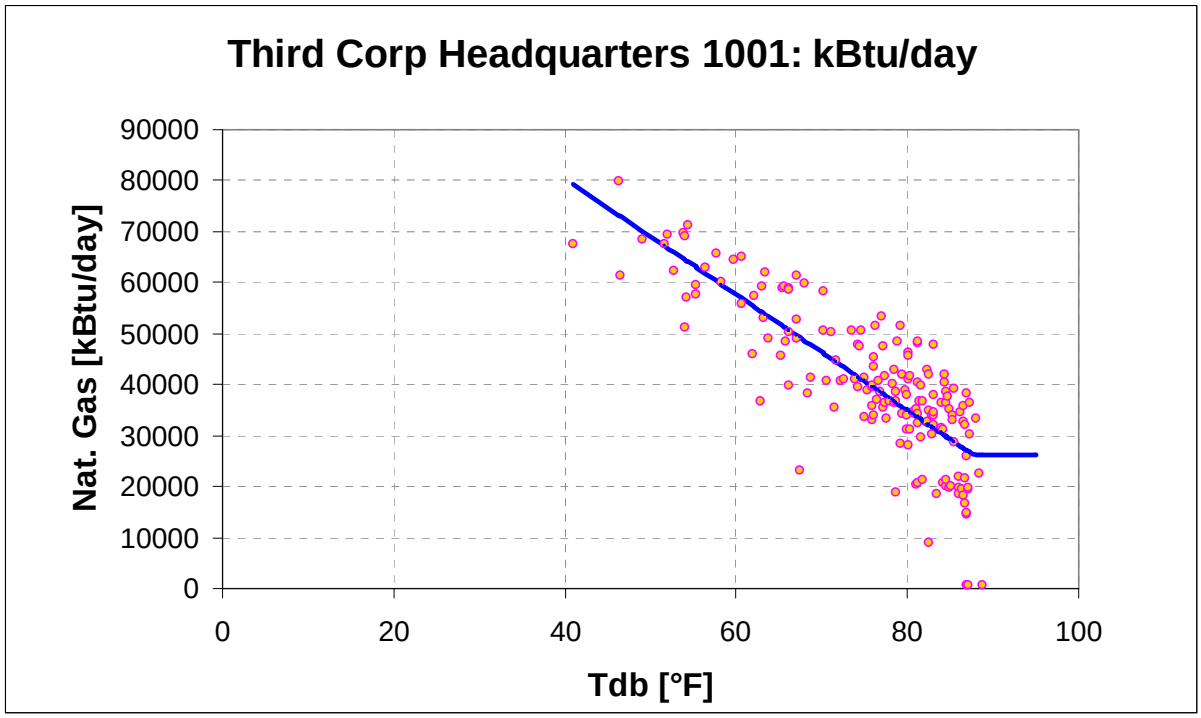


Figure 6.5: Baseline Model for the Whole-Building Natural Gas use.

7. BASELINE MODELS FOR 87000 BLOCK BUILDINGS

Baseline models for the 87000 block manual readings are included in the appendix to this report, and include the following buildings:

87003 BN HQ Building
87004 CO HQ Building
87005 BDE HQ Building
87006 Health Clinic Building
87007 Enlisted UPH Building
87008 BN HQ Building
87009 BN HQ Building
87010 PHYS FIT CTR Building
87011 CO HQ Building
87012 Enlisted UPH Building
87014 CO HQ Building
87015 Enlisted UPH Building
87016 CO HQ Building
87017 Dining Facility
87018 Electricity Use
87018 Natural Gas Use

8. BASELINE MODELS FOR NEW BUILDINGS

Meters were added in several new buildings, and meters were read manually by the Ft. Hood Energy Office during the period June 2002 to November 2002. The Ft. Hood Energy Office plans to continue these readings on a more frequent basis and the models will be updated when more readings become available. Information about these buildings is included in the appendix to this report.

Building Number	Building Name	Building Size (ft2)	Electricity	Natural Gas
194	NCO Club (Phantom Warrior Club)	19,023	√	√
410	Headquarters Building	102,391	√	√
1001	Third Corp Headquarters	312,800	√	√
4351	Motor Pool	16,317	√	√
5485	Pershing Youth Center	17,519	√	√
5764	Officers Club	36,649	√	√
6602	Bronco Youth Center	22,100	√	√
9212	Patton Inn	1,612	√	√
22020	Admin	21,096	√	√
28000	Headquarters Bldg	129,635	√	√
42000	Sports USA	23,341	√	√
50012	Community Event Center	4,203	√	√
52024	COMMAND Child Care	34,779	√	√
52381	Golf Pro Shop	3,061	√	√
70005	Longhorn Saloon	5,718	√	√

85018	Walker Youth Service Center	15,652	√	√
85020	Commissary	105,659	√	√
91012	Admin/ Operational Testing	86,292	√	√
91014	Admin	26,224	√	√

9. SUMMARY OF BASELINE MODELS: THERMAL PLANT, 87000 & III CORP

This section of the report contains a summary of the baseline models completed as of December 2002. This summary is presented in Table 9-1 and Table 9-2. The format for these tables reflects discussions with Johnson Controls and the Ft. Hood Energy Office in November 2002. These tables are color coded to reflect whether or not metering has been installed and is being recorded (yellow), or whether meters need to be installed (white). High priority buildings are also indicated (pink).

Table 9-2 contains a summary of the models for the 87000 block thermal plant (logger), 87000 block building (manual readings), III Corp building (logger). Models for the new buildings are presented in the appendix. However, it is recommended that additional data be collected and analyzed before accurate baseline models can be developed.

In Table 9-2, column 3 is the model type, column 4 shows the average daily electricity use predicted by the model, column 5 shows the uncertainty of the model (kWh/day), and column 6 shows the uncertainty as a percent of the average daily use.

Column 7 shows the model type for natural gas modeling, column 8 shows the average daily gas use predicted by the model, column 9 shows the uncertainty of the model (Btu/day), and column 10 shows the uncertainty as a percent of the average daily use. Column 11 and column 12 show the number of data points in the pre and post periods used to calculate the uncertainty.

Building Number	Building Name	Building Size (ft2)	Electricity Meter Status		Gas Meter Status	Type of Elec Metering Needed (kWh,kW)	Type of Gas Metering Needed	Annual Total kWH	Annual kWH Savings	% Annual Savings	$ Annual Savings	Total Annual Savings kWH+kW Savings	Total Annual kW Savings
			Type	Data?									
194	NCO Club (Phantom W	19,023	Man & ACR	YES	YES	WBE(kWh,kW)		TBD	511,903	NA	$ 21,449	$ 25,986	$ 4,537
410	Headquarters Building	102,391	Man & ACR	YES	YES	WBE(kWh,kW)	WBNG	TBD	931,344	NA	$ 39,023	$ 49,482	$ 10,459
1001	Third Corp Headquarte	312,800	Logger	YES	YES	WBE(kWh,kW)		TBD	821,700	NA	$ 34,429	$ 34,762	$ 332
4351	Motor Pool	16,317	Manual	YES	YES	WBE(kWh,kW)		TBD	25,314	NA	$ 1,061	$ 3,173	$ 2,112
5485	Pershing Youth Center	17,519	Manual	YES	YES	WBE(kWh,kW)	WBNG	TBD	34,329	NA	$ 1,438	$ 2,423	$ 984
5764	Officers Club	36,649	Man & ACR	YES	YES	WBE(kWh,kW)	WBNG	TBD	319,596	NA	$ 13,391	$ 13,626	$ 235
6602	Bronco Youth Center	22,100	Man & ACR	YES	YES	WBE(kWh,kW)	WBNG	TBD	85,034	NA	$ 3,563	$ 5,163	$ 1,600
9112	Motor Pool	20,832	Man & ACR	YES	NO	WBE(kWh,kW)		TBD	106,906	NA	$ 4,479	$ 5,629	$ 1,149
9122	Motor Pool	20,832	Man & ACR	YES	NO	WBE(kWh,kW)		TBD	117,344	NA	$ 4,917	$ 5,537	$ 621
9127	Motor Pool	20,240	BLINK	NO	NO	WBE(kWh,kW)		TBD	58,304	NA	$ 2,443	$ 3,898	$ 1,455
9212	Patton Inn	1,612	Manual	YES	YES	WBE(kWh,kW)	WBNG	TBD	13,221	NA	$ 554	$ 1,217	$ 663
9513	Motor Pool	20,832	Man & ACR	YES	NO	WBE(kWh,kW)		TBD	90,926	NA	$ 3,810	$ 4,608	$ 798
9535	Motor Pool	20,240	BLINK	NO	NO	WBE(kWh,kW)		TBD	67,860	NA	$ 2,843	$ 2,843	$ -
9553	Motor Pool	24,560	BLINK	NO	NO	WBE(kWh,kW)		TBD	40,097	NA	$ 1,680	$ 2,643	$ 963
15060	Motor Pool	20,240	Man & ACR	YES	NO	WBE(kWh,kW)		TBD	83,276	NA	$ 3,489	$ 4,459	$ 970
19012	Motor Pool	20,240	BLINK	NO	NO	WBE(kWh,kW)		TBD	42,618	NA	$ 1,786	$ 2,918	$ 1,132
22020	Admin	21,096	Man & ACR	YES	YES	WBE(kWH)	WBNG	TBD	195,943	NA	$ 8,210	$ 9,056	$ 845
28000	Headquarters Bldg	129,635	Man & ACR	YES	YES	WBE(kWh,kW)	WBNG	TBD	300,217	NA	$ 12,579	$ 13,177	$ 598
30015	Motor Pool	20,240	BLINK	NO	NO	WBE(kWh,kW)		TBD	63,486	NA	$ 2,660	$ 3,753	$ 1,093
30017	Motor Pool	20,240	BLINK	NO	NO	WBE(kWh,kW)		TBD	58,581	NA	$ 2,455	$ 3,265	$ 811
30033	Motor Pool	20,240	BLINK	NO	NO	WBE(kWh,kW)		TBD	69,343	NA	$ 2,905	$ 3,315	$ 409
35014	Motor Pool	20,480	BLINK	NO	NO	WBE(kWh,kW)		TBD	52,109	NA	$ 2,183	$ 2,183	$ -
35023	Motor Pool	23,040	BLINK	NO	NO	WBE(kWh,kW)		TBD	41,741	NA	$ 1,749	$ 2,228	$ 479
38003	Motor Pool	20,240	BLINK	NO	NO	WBE(kWh,kW)		TBD	64,908	NA	$ 2,720	$ 3,679	$ 960
38014	Motor Pool	20,240	BLINK	NO	NO	WBE(kWh,kW)		TBD	50,299	NA	$ 2,108	$ 2,341	$ 234
42000	Sports USA	23,341	Man & ACR	BROKEN	YES	WBE(kWH)	WBNG	TBD	406,107	NA	$ 17,016	$ 17,514	$ 498
50012	Community Event Cen	4,203	Manual	YES	YES	WBE(kWh,kW)	WBNG	TBD	13,713	NA	$ 575	$ 2,657	$ 2,082
52019	Comanche Community	13,450	Manual	YES	YES	WBE(kWh,kW)	WBNG	TBD	196,510	NA	$ 8,234	$ 8,880	$ 647
52381	Golf Pro Shop	3,061	Manual	YES	YES		WBNG	TBD					$ -
52024	COMMAND Child Cat	34,779	Man & ACR	YES	YES	WBE(kWh,kW)	WBNG	TBD	376,866	NA	$ 15,791	$ 16,295	$ 504
70005	Longhorn Saloon	5,718	Manual	YES	YES	WBE(kWh,kW)		TBD	134,677	NA	$ 5,643	$ 5,839	$ 196
85018	Walker Youth Service	15,652	Manual	YES	YES	WBE(kWh,kW)		TBD	50,954	NA	$ 2,135	$ 2,135	$ -
85020	Commissary	105,659	Man & ACR	YES	YES	WBE(kWh,kW)		TBD	165,961	NA	$ 6,954	$ 7,262	$ 308
87003	BN HQ Building and C	12,314	87000 Block	YES	STEAM	WBE(kWh,kW)		189,001	51,320	27.2%	$ 2,150	$ 2,867	$ 717
87004	CO HQ Building	18,818	87000 Block	BROKEN	STEAM	WBE(kWh,kW)		273,750	46,779	17.1%	$ 1,960	$ 2,719	$ 759
87005	BDE HQ Building	9,840	87000 Block	YES	STEAM	WBE(kWH)		164,593	26,450	16.1%	$ 1,108	$ 1,805	$ 697
87006	Offices	4,073	87000 Block	YES	STEAM	WBE(kWh,kW)		49,275	11,047	22.4%	$ 463	$ 486	$ 23
87007	Enlisted UPH	31,470	87000 Block	YES	STEAM	WBE(kWh,kW)		260,610	5,887	2.3%	$ 247	$ 247	$ -
87008	BN HQ Building	6,371	87000 Block	YES	STEAM	WBE(kWh,kW)		129,893	18,412	14.2%	$ 771	$ 1,197	$ 425
87009	BN HQ Building and C	12,381	87000 Block	YES	STEAM	WBE(kWh,kW)	WBNG	237,064	49,190	20.7%	$ 2,061	$ 2,076	$ 15
87010	Physical Fitness Center	23,631	87000 Block	YES	STEAM	WBE(kWh,kW)		364,635	98,108	26.9%	$ 4,111	$ 4,807	$ 697
87011	CO HQ Building	25,618	87000 Block	YES	STEAM	WBE(kWH)		180,639	55,680	and kw	$ 2,333	$ 2,726	$ 393
87012	Enlisted UPH	42,306	87000 Block	YES	STEAM	WBE(kWh,kW)		438,000	9,719	2.2%	$ 407	$ 476	$ 68
87013	Enlisted UPH	31,740	87000 Block	NO	STEAM	WBE(kWh,kW)		TBD	6,439		$ 270	$ 827	$ 557
87014	CO HQ Building	14,162	87000 Block	YES	STEAM	WBE(kWh,kW)		136,875	32,892	24.0%	$ 1,378	$ 1,727	$ 349
87015	Enlisted UPH	42,306	87000 Block	YES	STEAM	WBE(kWh,kW)		123,370	6,502	5.3%	$ 272	$ 276	$ 4
87016	CO HQ Building	25,168	87000 Block	YES	STEAM	WBE(kWh,kW)		182,500	50,197	27.5%	$ 2,103	$ 2,341	$ 238
87017	Dining Facility	15,695	87000 Block	YES	STEAM	WBE(kWh,kW)	WBNG	420,080	41,390	9.9%	$ 1,734	$ 2,269	$ 534
87018	Physical Plant - 87000	3,327	Logger	YES	STEAM	WBE(kWh,kW)		4,380,000	522,971	11.9%	$ 21,912	$ 23,628	$ 1,715
87019	CO HQ Building	18,818	BLINK	NO	STEAM	WBE(kWh,kW)		TBD	33,628	NA	$ 1,409	$ 1,409	$ -
87020	Enlisted UPH	42,306	BLINK	NO	STEAM	WBE(kWh,kW)		TBD	38,111	NA	$ 1,597	$ 1,597	$ -
87021	Enlisted UPH	87,021	BLINK	NO	STEAM	WBE(kWh,kW)		TBD	6,523	NA	$ 273	$ 273	$ -
87022	Enlisted UPH	42,306	BLINK	NO	STEAM	WBE(kWh,kW)	STEAM	TBD	23,936	NA	$ 1,003	$ 1,003	$ -
91002	Headquarters Bldg	38,462	Man & ACR	YES	YES	WBE(kWh,kW)	WBNG	TBD	218,137	NA	$ 9,140	$ 9,140	$ -
91012	Admin/ Operational Te	86,292	Man & ACR	YES	YES	WBE(kWh,kW)	WBNG	TBD	391,136	NA	$ 16,389	$ 16,389	$ -
91014	Admin	26,224	Man & ACR	YES	YES	WBE(kWH)	WBNG	TBD	162,590	NA	$ 6,813	$ 6,813	$ -
T.Gas	Main/West/North Subs	1,858,390	Logger	YES						Total	$ 314,176	$ 359,043	$ 44,867
T.Ele	TXU Gas Data		Internet	YES						Percent	88%	100%	12%

apx. 15 bldg $ 257,847 $ 20,875
72% 47%

NOTE:
Option A = Performance meas., usage stipulated.
Option B = Performance meas., usage partially measured
Option Cm= Before/after calculations using manual readings
Option Ch= Before/after calculations using hourly UMCS readings
Option D*= Uncalibrated simulation

Table 9-1:Summary of Buildings Affected by Energy Services Contract.

Building Number	Building Name	/BE -Consumption (kWh/day)				Natural Gas					
		model	Predicted Ann 9/2001-8/2002	Uncertainty kWh/day	Model Uncertainty %	model	Predicted Ann 9/2001-8/2002		Model Uncertainty %	Npre	Npost
194	NCO Club (Phantom Warrior Club)										
410	Headquarters Building										
1001	Wbele-(MCC+Wbcool) weekends	1p	648,959	2,504	0.39%					65	65
Third Corp	Wbele-(MCC+Wbcool) weekdays	1p	2,116,018	2,549	0.12%					158	158
Third Corp	Chiller	3p	1,279,893	2,850	0.22%					218	218
Third Corp	MCC	3p	578,809	786	0.14%					218	218
Third Corp	Gas					3p	6,755,284	16,840	0.25%	169	169
4351	Motor Pool										
5485	Pershing Youth Center										
5764	Officers Club										
6602	Bronco Youth Center										
9112	Motor Pool										
9122	Motor Pool										
9127	Motor Pool										
9212	Patton Inn										
9513	Motor Pool										
9535	Motor Pool										
9553	Motor Pool										
15060	Motor Pool										
19012	Motor Pool										
22020	Admin										
28000	Headquarters Bldg										
30015	Motor Pool										
30017	Motor Pool										
30033	Motor Pool										
35014	Motor Pool										
35023	Motor Pool										
38003	Motor Pool										
38014	Motor Pool										
42000	Sports USA										
50012	Community Event Center										
52019	Comanche Community Activity Center										
52381	Golf Pro Shop										
52024	COMMAND Child Care										
70005	Longhorn Saloon										
85018	Walker Youth Service Center										
85020	Commissary										
87003	BN HQ Building and Org Classroom	1p	53,355	126	0.24%					105	105
87004	CO HQ Building										
87005	BDE HQ Building	3p	46,374	194	0.42%					102	102
87006	Offices	1p	13,586	42	0.31%					105	105
87007	Enlisted UPH	4p	68,894	136	0.20%					81	81
87008	BN HQ Building	1p	37,346	83	0.22%					105	105
87009	BN HQ Building and Org Classroom	1p	66,446	144	0.22%					104	104
87010	Physical Fitness Center	1p	97,943	264	0.27%					92	92
87011	CO HQ Building	3p	50,120	170	0.34%					95	95
87012	Enlisted UPH	2p	126,238	236	0.19%					105	105
87013	Enlisted UPH										
87014	CO HQ Building	2p	32,647	106	0.32%					95	95
87015	Enlisted UPH	3p	36,541	108	0.30%					93	93
87016	CO HQ Building	3p	50,949	241	0.47%					105	105
87017	Dining Facility	3p	129,356	302	0.23%					94	94
87018						3p	588,382	4,137	0.70%	70	70
Physical	MCC	2p	265,068	139	0.05%					76	76
Physical	Chiller	3p	343,448	2,432	0.71%					55	55
Physical	Gas Before 4/23/02					1p	462	3	0.74%	34	34
Physical	Gas After 4/23/02					1p	577	1	0.26%	130	130
87019	CO HQ Building										
87020	Enlisted UPH										
87021	Enlisted UPH										
87022	Enlisted UPH										
91002	Headquarters Bldg										
91012	Admin/ Operational Testing										
91014	Admin										
T.Gas	Main/West/North Substations (3)										
T.Ele	TXU Gas Data										

Table 9-2: Summary of Preliminary Baseline Modeling results for 2000 through 2002.

10. WHOLE-BASE NATURAL GAS ANALYSIS

10.1. Monthly and Daily Natural Gas Data.

The Ft. Hood base is served by three gas meters, including a west, south and north meters. Data from these meters are recorded by TXU and transferred to the Ft. Hood energy office in daily format. The monthly data are shown in Figure 6.1, which shows the monthly total gas use for 1999 and 2000, along with the average monthly temperature. In Figure 6.2 these same data are plotted as a scatter plot versus average monthly temperature. In these plots is clear that there is a strong weather dependency in the natural gas use, as expected.

In Figure 6.3 the daily gas data for the west, south and north meters for 1999 are shown as a time series plot along with the corresponding daily temperature data. In Figure 6.4 the total natural gas consumption for Ft. Hood are shown as a time series plot and as a scatter plot versus average daily temperatures for 1999 from the National Weather Service (NWS). In Figure 6.5 the daily gas data for the west, south and north meters for 2000 are shown as a time series plot along with the corresponding daily temperature data. In Figure 6.6 the total natural gas consumption for Ft. Hood are shown as a time series plot and as a scatter plot versus average daily temperatures for 2000 from the National Weather Service (NWS).

In Figures 6.7 through 6.10 a comparison of 1999 and 2000 data are presented for the west, south, north and total meters. In these plots it is clear that, although there is a strong weather dependency, there is also some year to year variation in the natural gas use. This year to year variation is a cause for concern when establishing a baseline usage for the whole-base. This is because the gas use appears to have increased from 1999 to 2000 by a significant amount. This increase seems to be associated with usage in the south meter and appears to be an increase of about 700 MCF/day. Should the usage difference be determined to be due to a known problem that can be fixed, then it is suggested that the usage for 1999 be used for the baseline. Otherwise, 2000 should be used for the baseline.

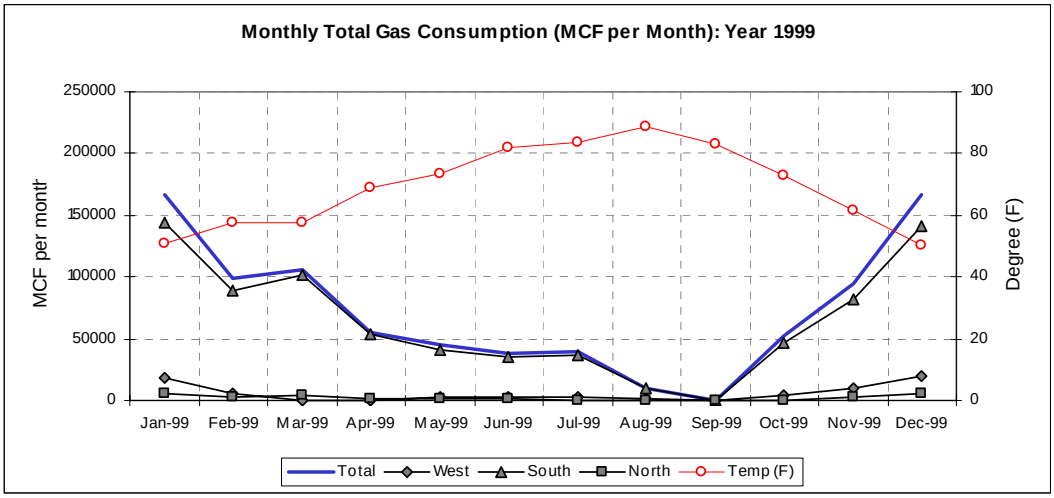
10.2. Baseline models.

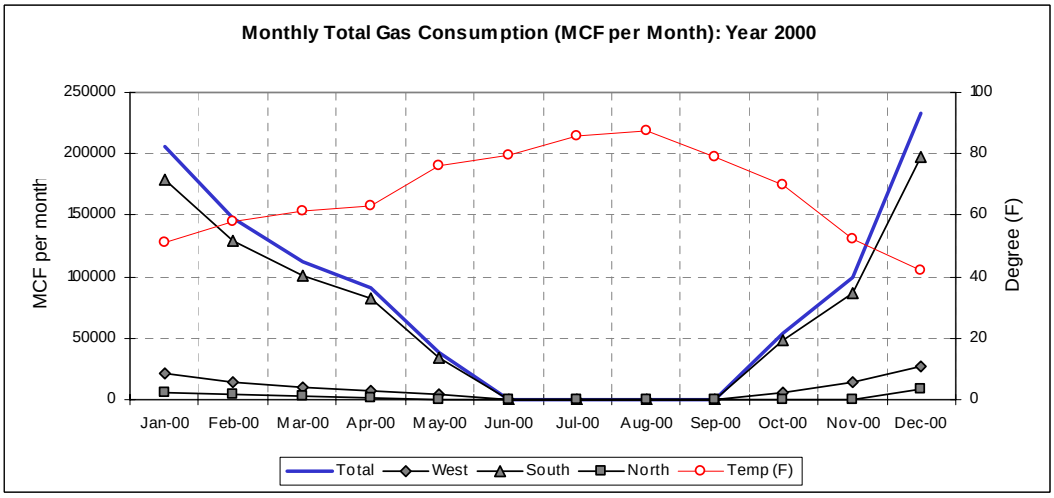
In Figures 6.11 through 6.13 three parameter models are shown for the daily average natural gas use for the whole-base. A closer look at the weather-independent baseline use (i.e., the Ycp value) shows a similar change in use from 1999 to 2000 of about 300 MCF/day, which is reduced only slightly when the two years are averaged. Clearly, if no other data were available, the monthly natural gas use would be acceptable for modeling the whole-base gas use. However, since the daily data are available, then a more detailed model can be developed.

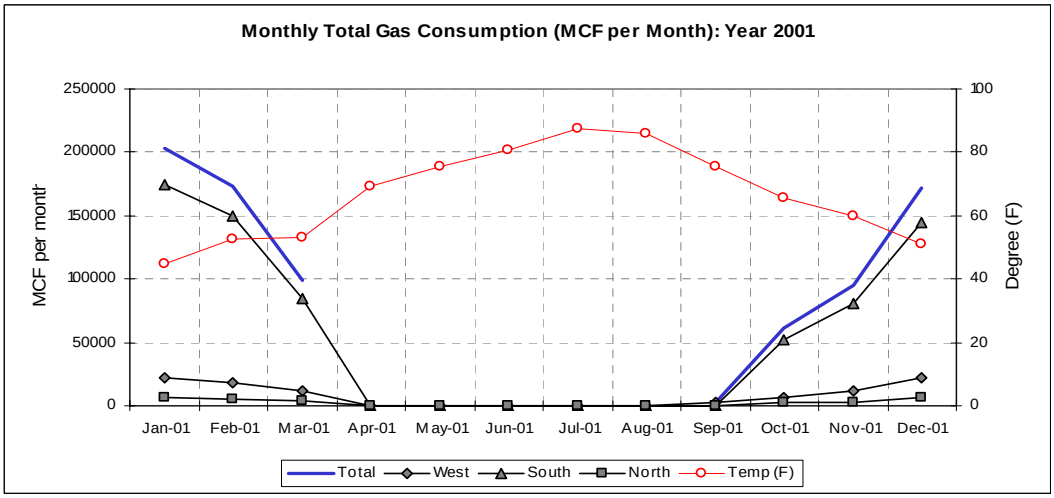
In Figures 6.14 through 6.22 three parameter models of the natural gas use are presented. Hence the need for models of the daily natural gas use. In Figures 6.14 – 6.17 models for the 1999 gas use for the west, south, north and total gas use are presented. In Figures 6.18 – 6.21 models are presented for the 2000 gas use for the west, south, north and total gas use. Figure 6.22 shows a combined 1999 and 2000 three parameter model that clearly shows the 700 MCF/day increase in the baseline gas use in 2000 when compared to 1999. As mentioned

before, if the reason for this increase can be identified and solved prior to the ESPC contract, then it is recommended that the 1999 gas model be used, since this will make the baseline use lower and will lead to less savings.

Also of interest is the fact that not only does the baseline use increase but the slope of the weather intensity also increased from 1999 to 2000, which is further reason for a close inspection of the natural gas consuming systems. Although there is considerable scatter in the daily natural gas models, the R2 of 0.67 and 0.79 and RMSE of 1153 and 1267 for the 1999 and 2000 models, respectively, indicate that the gas use is moderately well described by the three parameter models.


Monthly Total Gas Consumption (MCF per Month): Year 1999
MCF per month
Degree (F)
250000
200000
150000
100000
50000
0
100
80
60
40
20
0
Jan-99
Feb-99
Mar-99
Apr-99
May-99
Jun-99
Jul-99
Aug-99
Sep-99
Oct-99
Nov-99
Dec-99
Total
West
South
North
Temp (F)


Monthly Total Gas Consumption (MCF per Month): Year 2000
MCF per month
Degree (F)
250000
200000
150000
100000
50000
0
100
80
60
40
20
0
Jan-00
Feb-00
Mar-00
Apr-00
May-00
Jun-00
Jul-00
Aug-00
Sep-00
Oct-00
Nov-00
Dec-00
Total
West
South
North
Temp (F)


Monthly Total Gas Consumption (MCF per Month): Year 2001
MCF per month
Degree (F)
250000
200000
150000
100000
50000
0
100
80
60
40
20
0
Jan-01
Feb-01
Mar-01
Apr-01
May-01
Jun-01
Jul-01
Aug-01
Sep-01
Oct-01
Nov-01
Dec-01
Total
West
South
North
Temp (F)

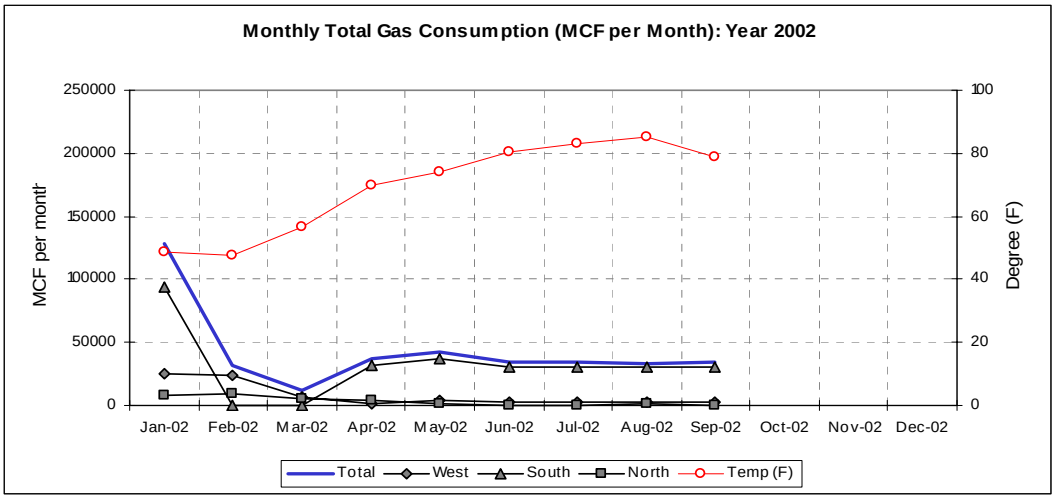


Figure 10.2-1: 1999-2000 Monthly Total Gas Use.

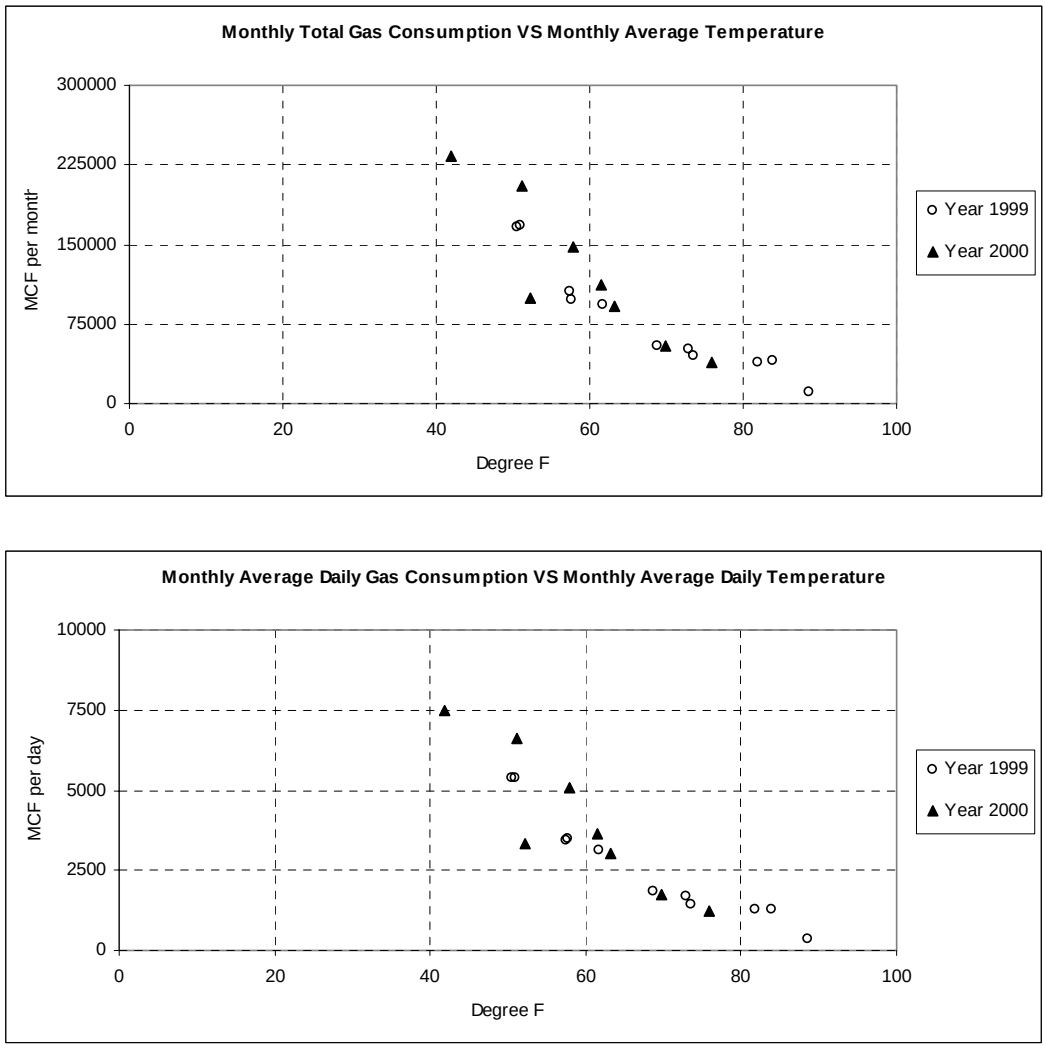
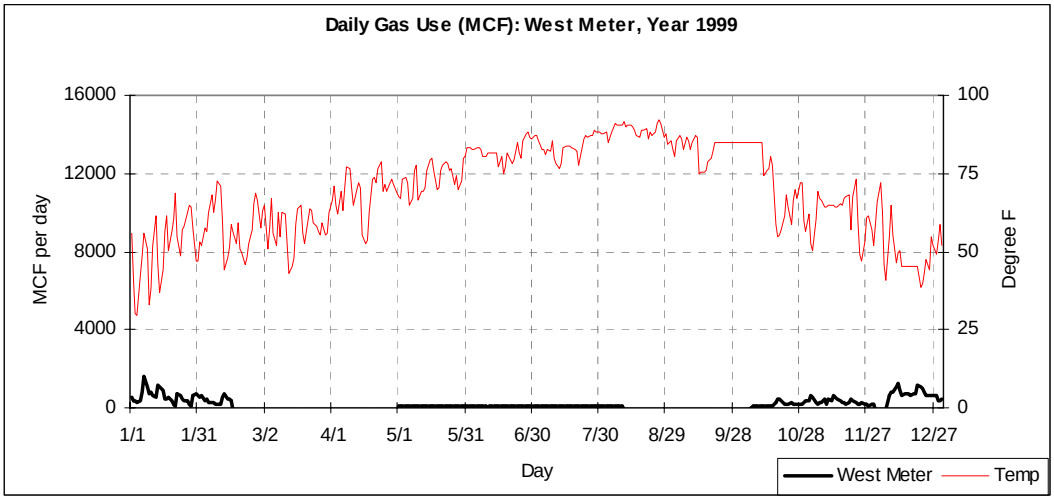
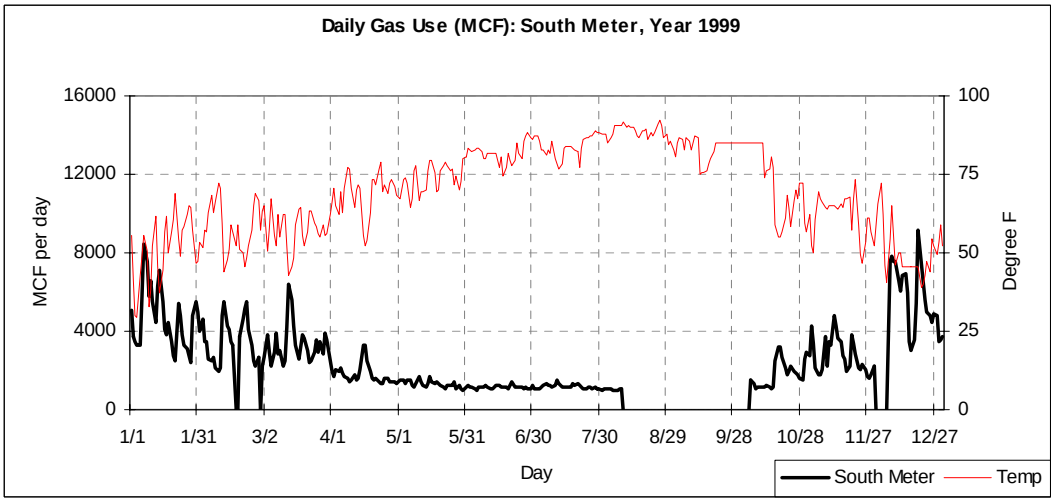


Figure 10.2-2: 1999 and 2000 Monthly Total Gas Use.





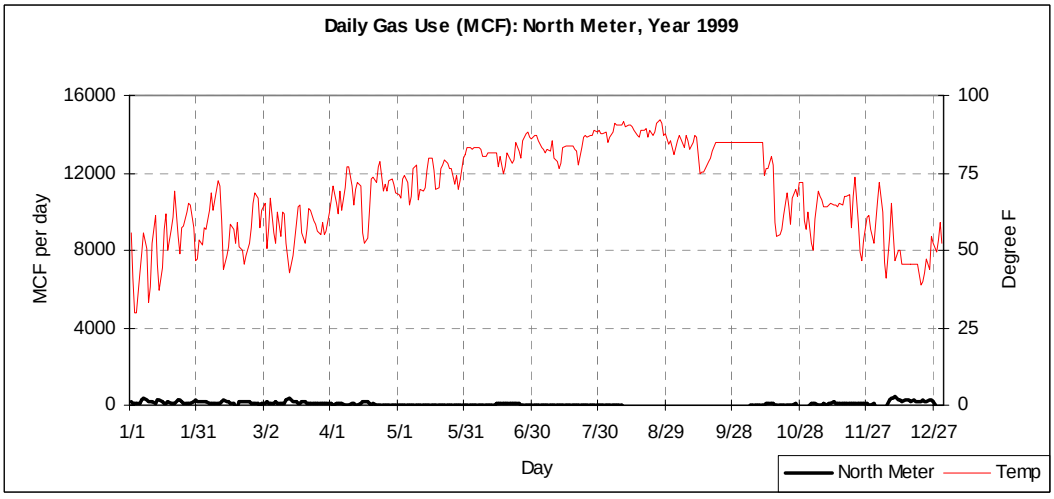
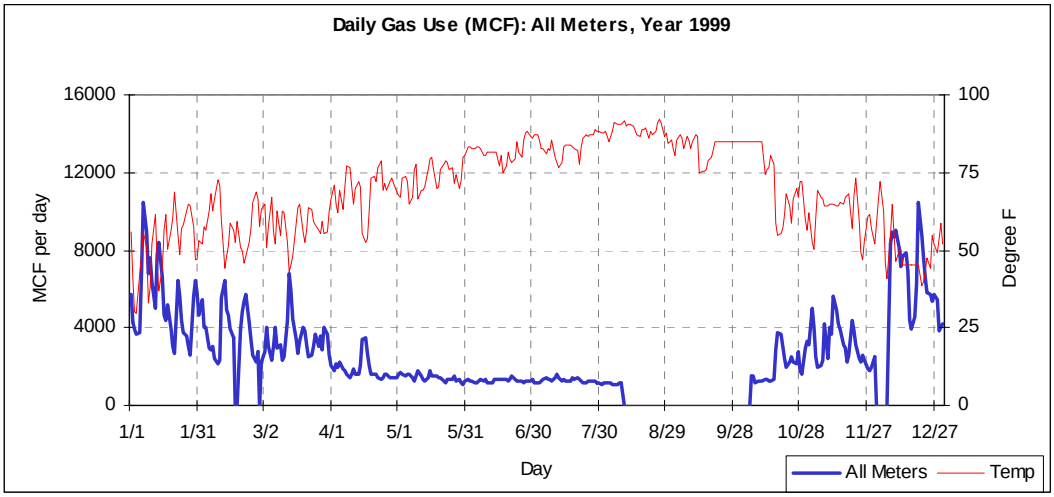


Figure 10.2-3: 1999 Daily Gas Use for West, South and North Meters..



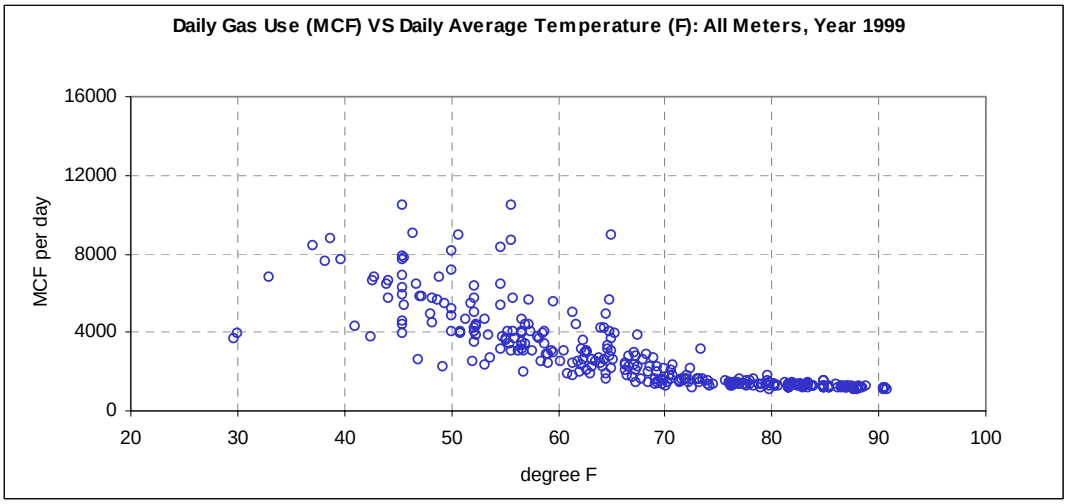
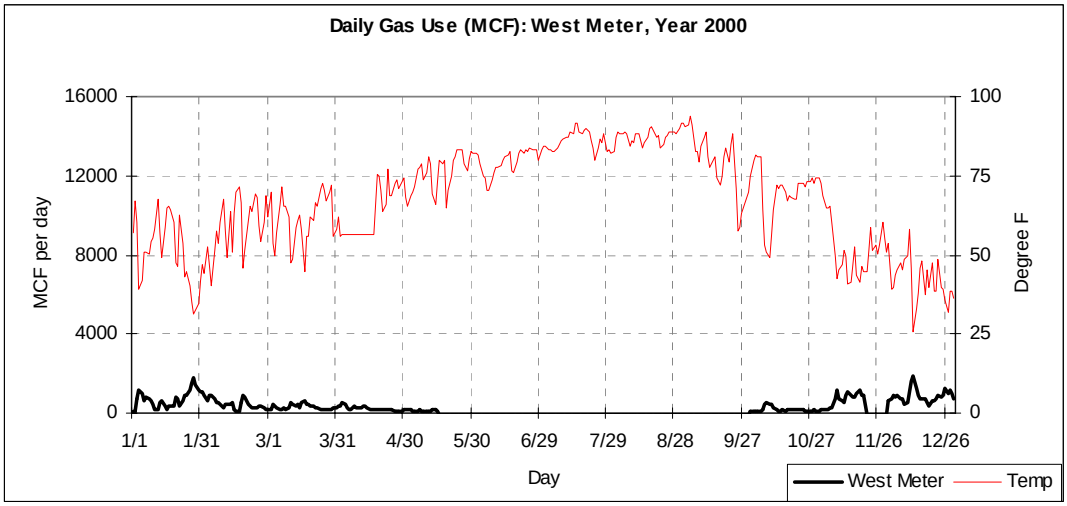
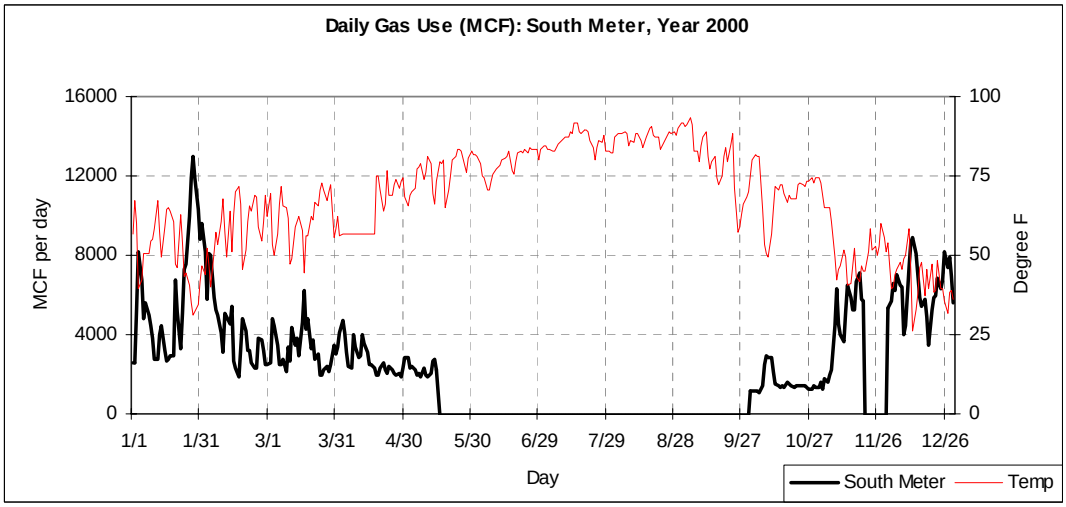


Figure 10.2-4: 1999 Daily Gas Use for All Meters.





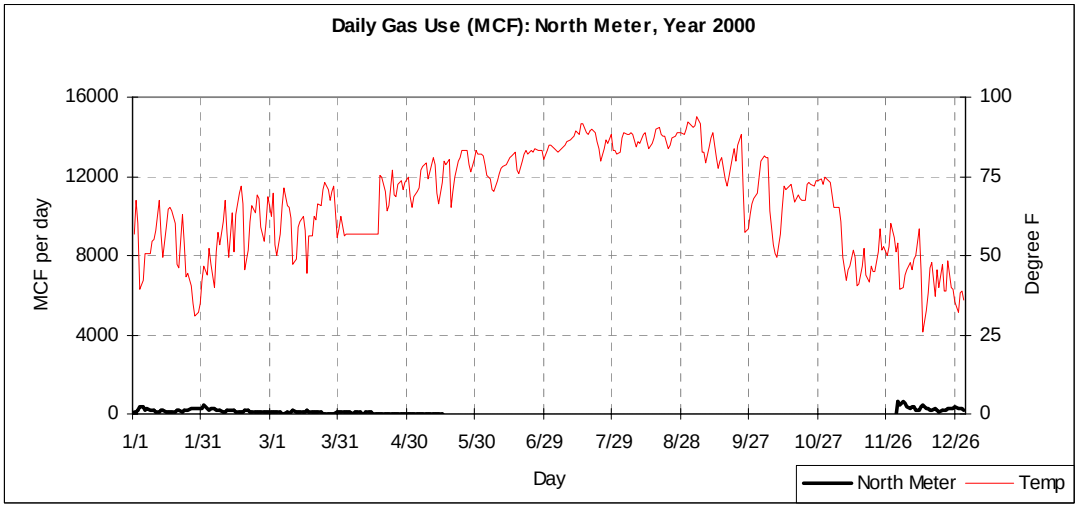
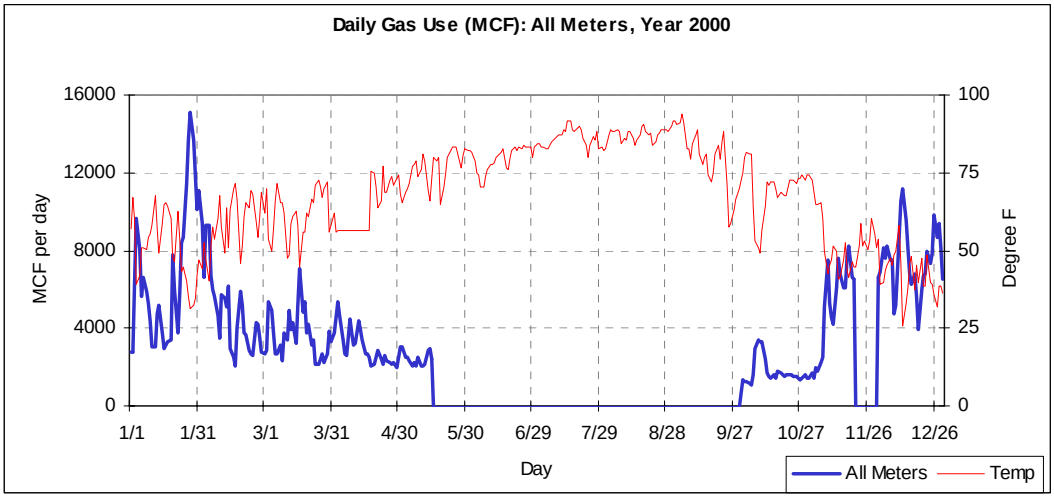


Figure 10.2-5: 2000 Daily Gas Use for West, South and North Meters.



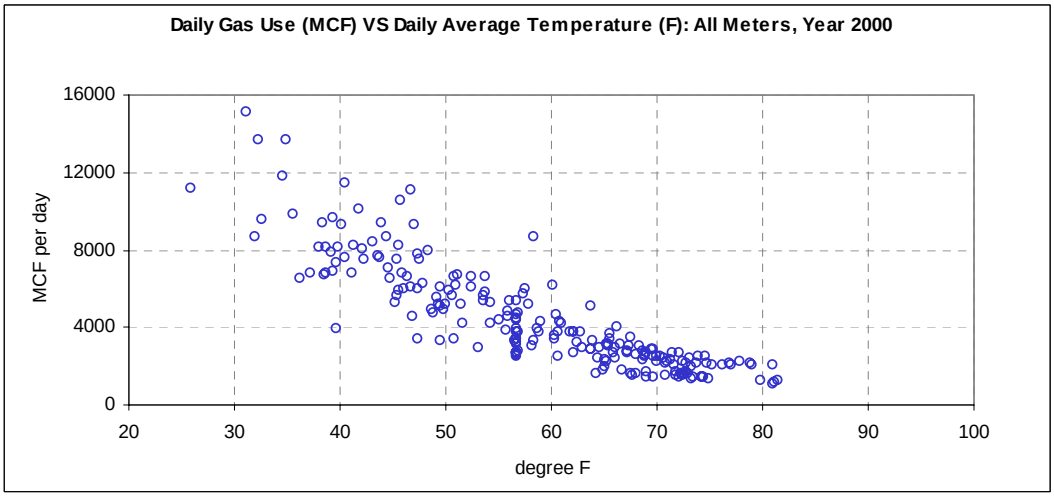
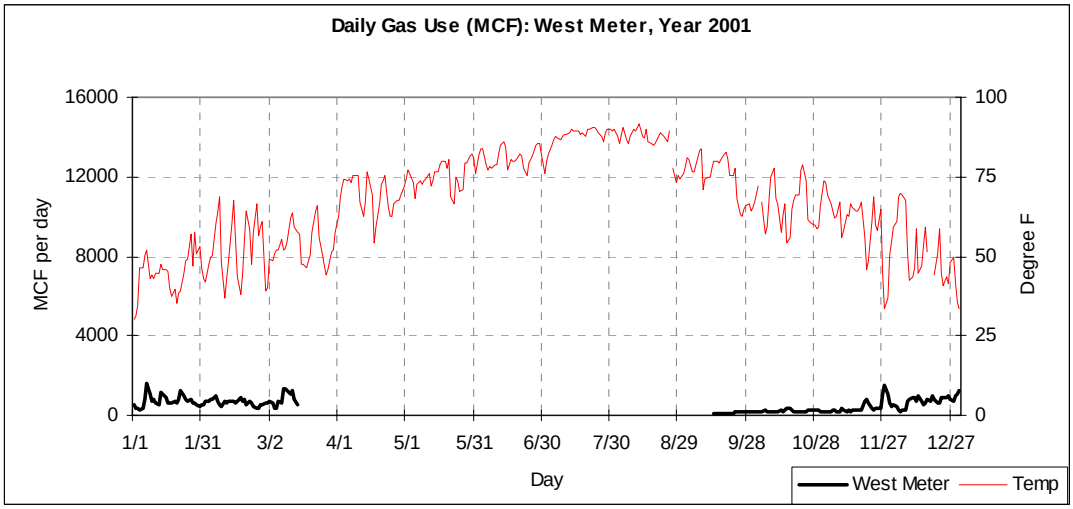
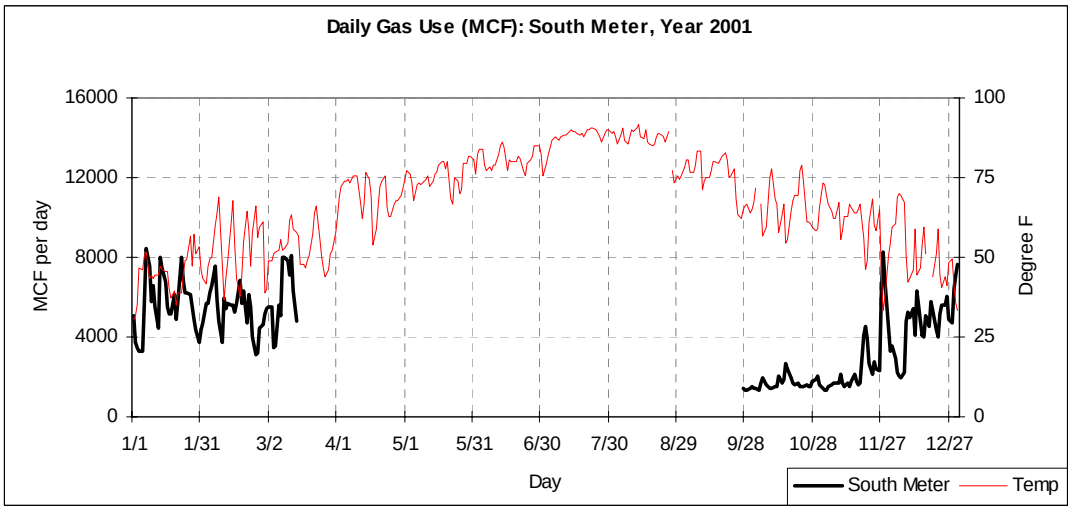


Figure 10.2-6: 2000 Daily Gas Use for All Meters.





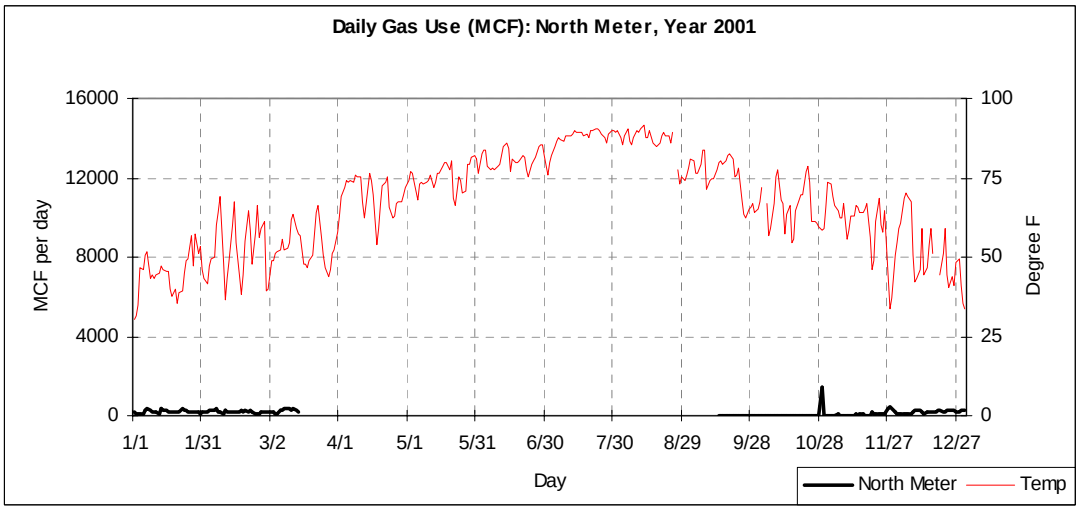


Figure 10.2-7: 2001 Daily Gas Use for West, South and North Meters.

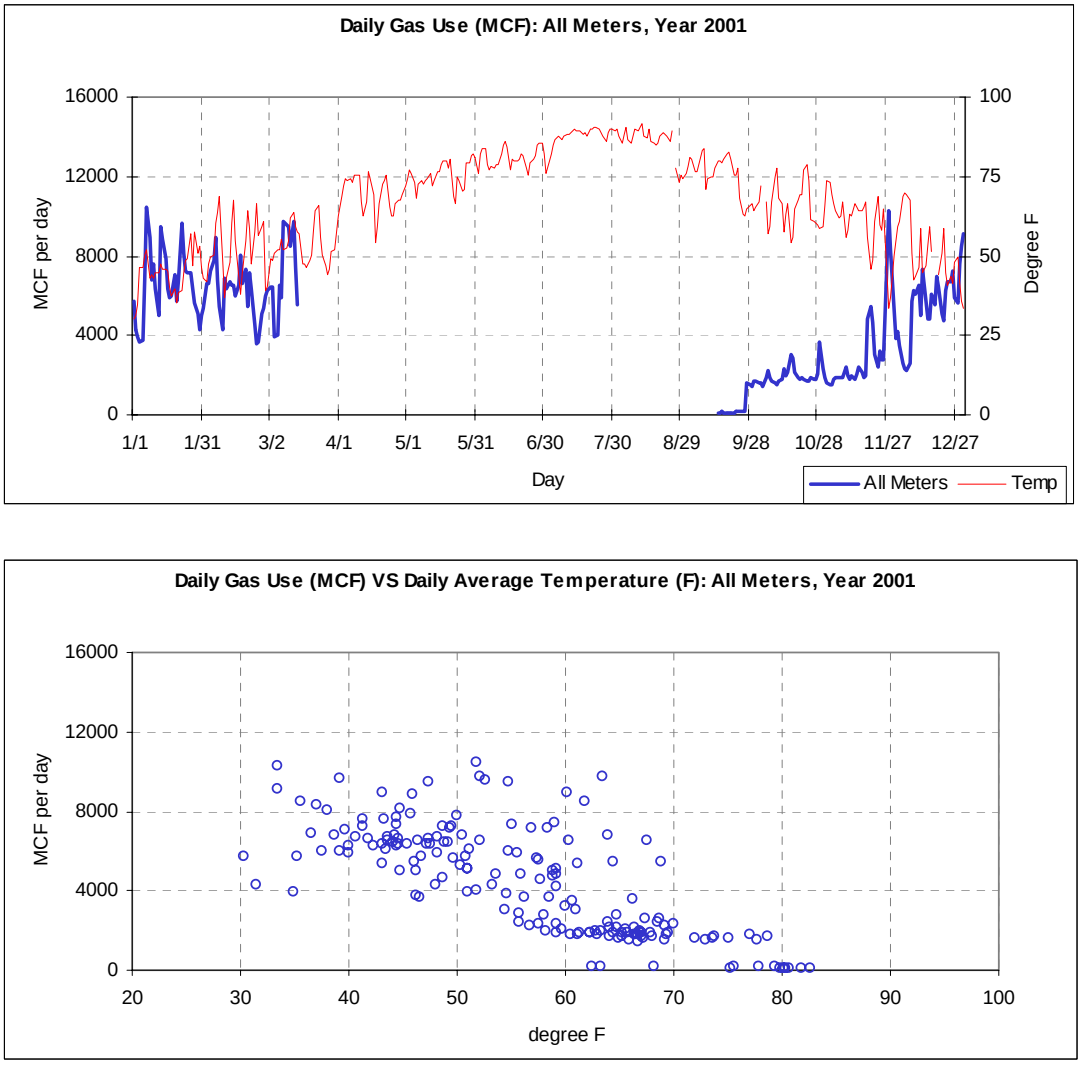
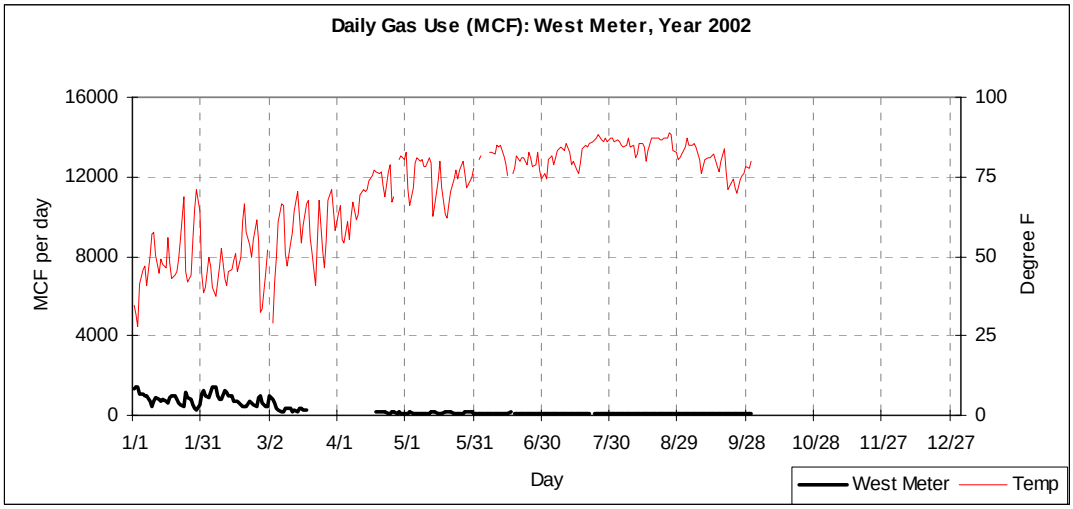
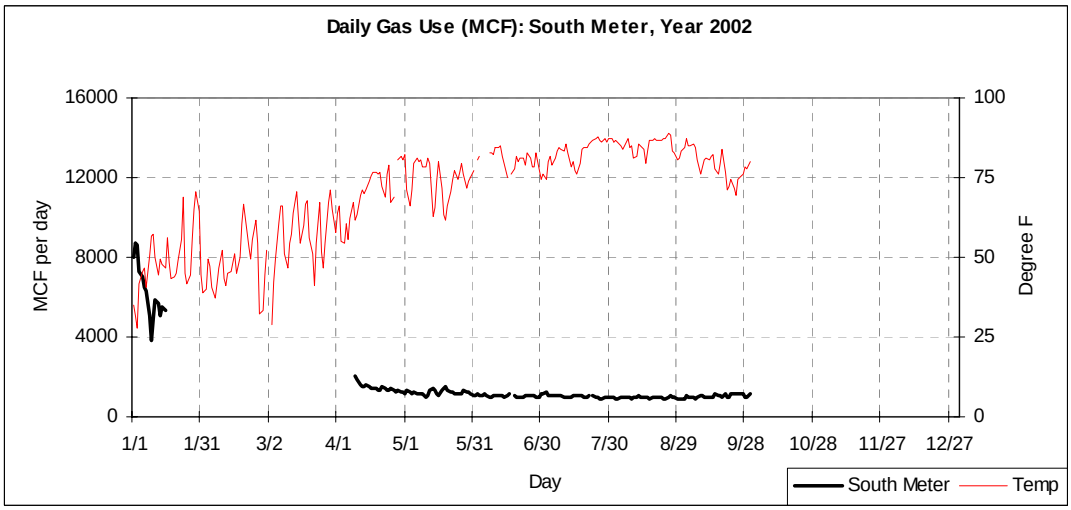


Figure 10.2-8: 2001 Daily Gas Use for All Meters.





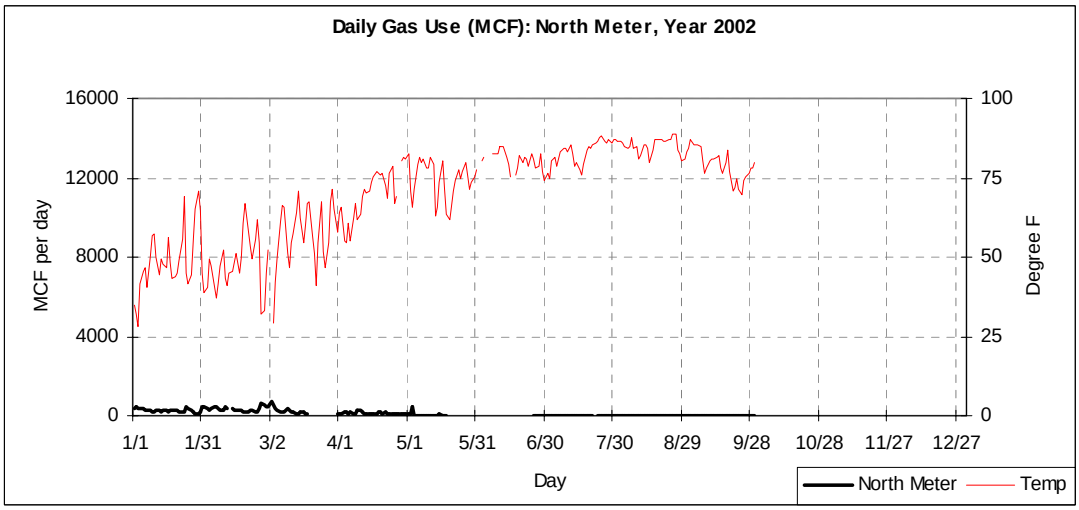


Figure 10.2-9: 2002 Daily Gas Use for West, South and North Meters.

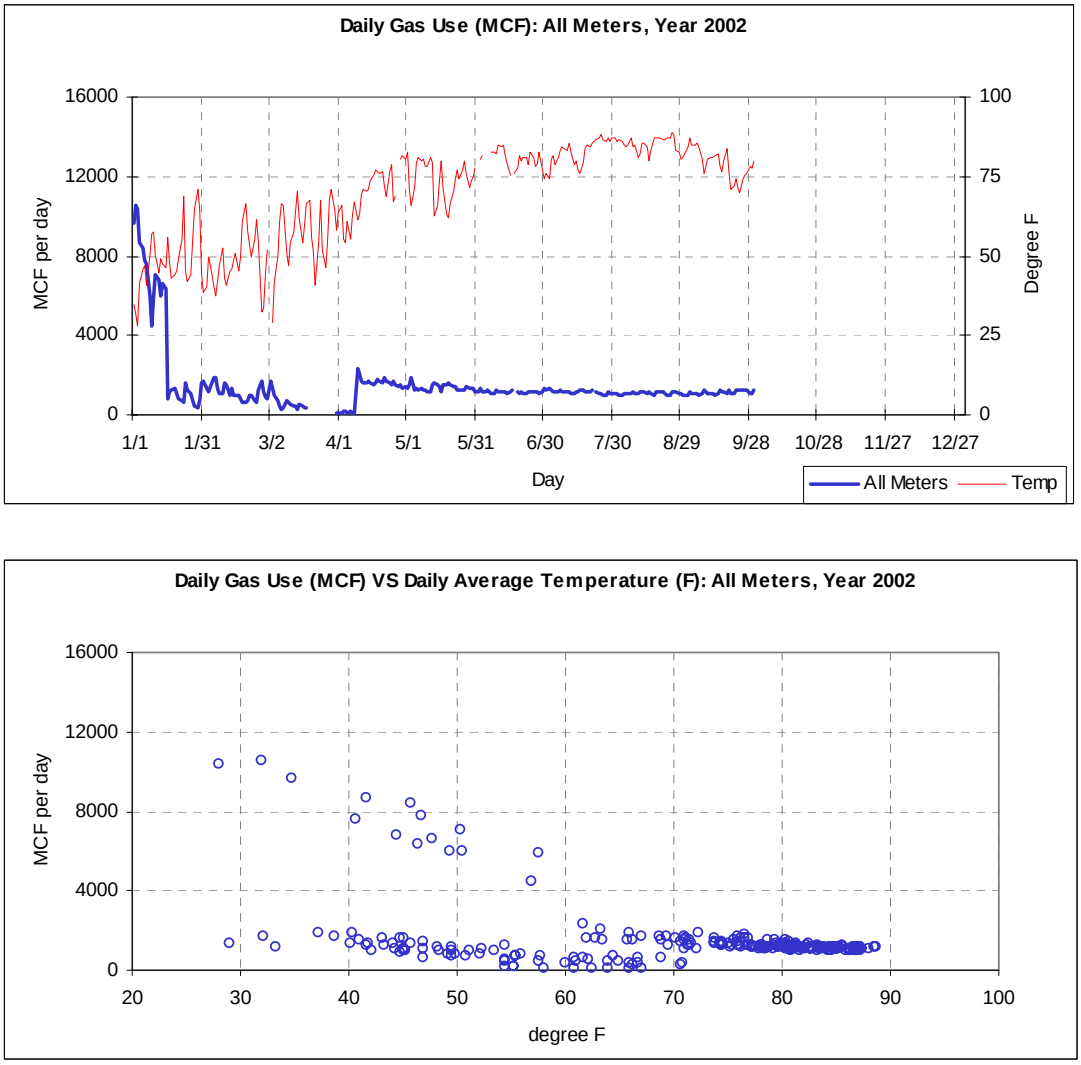
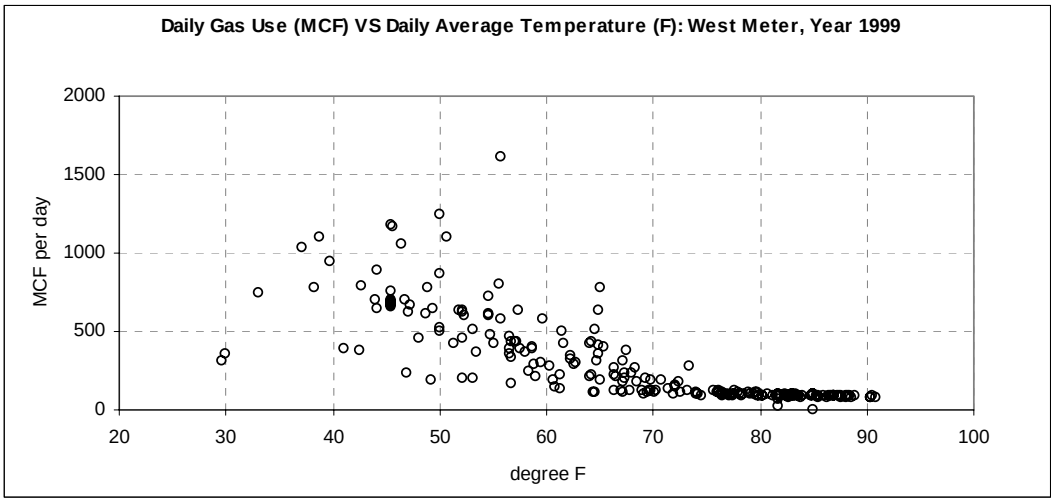
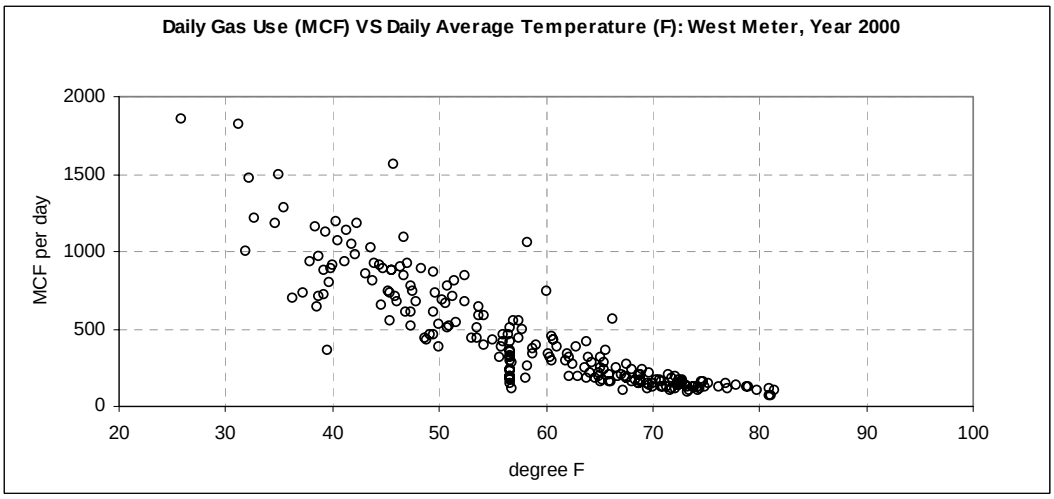


Figure 10.2-10: 2002 Daily Gas Use for All Meters.





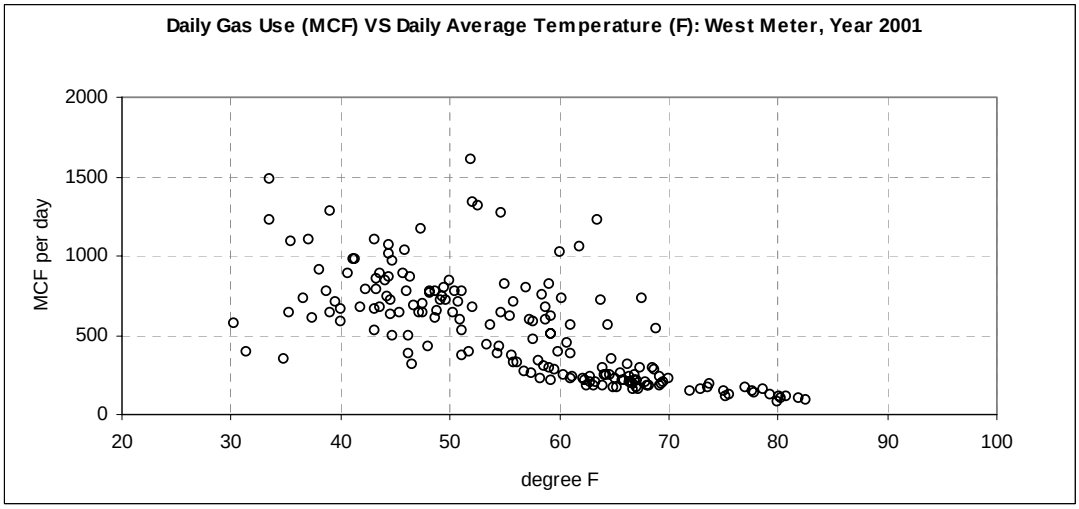


Figure 10.2-11: 1999, 2000, 2001 and 2002 Daily Gas Use for West Meter vs Temperature.

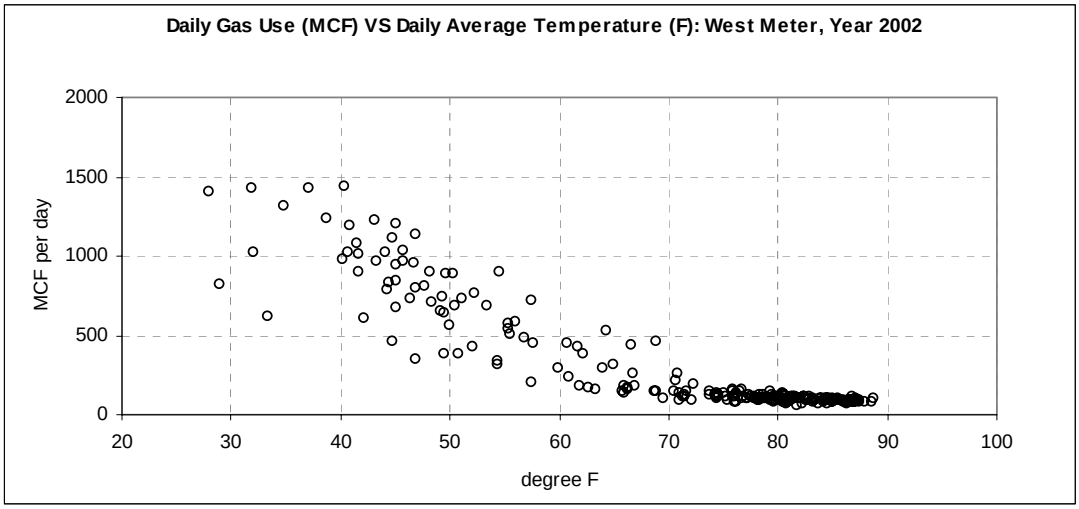
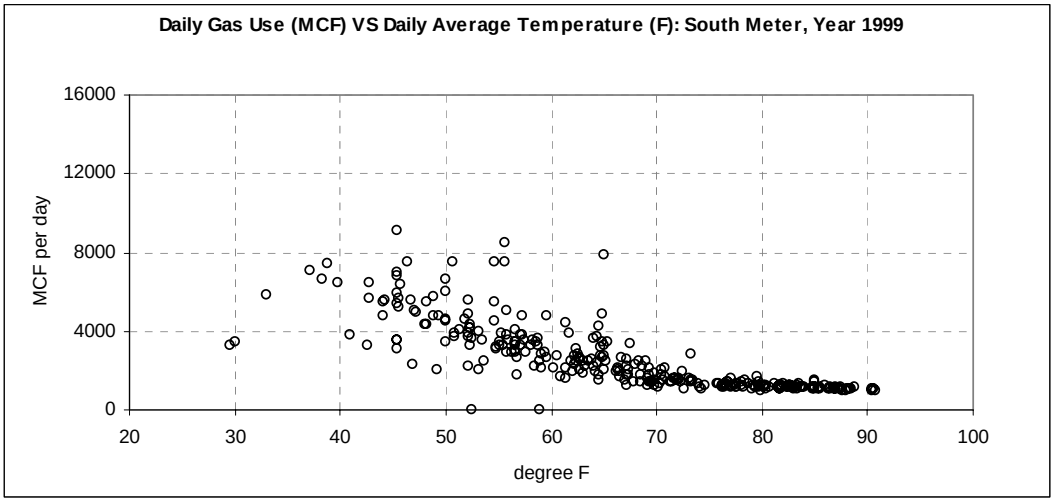
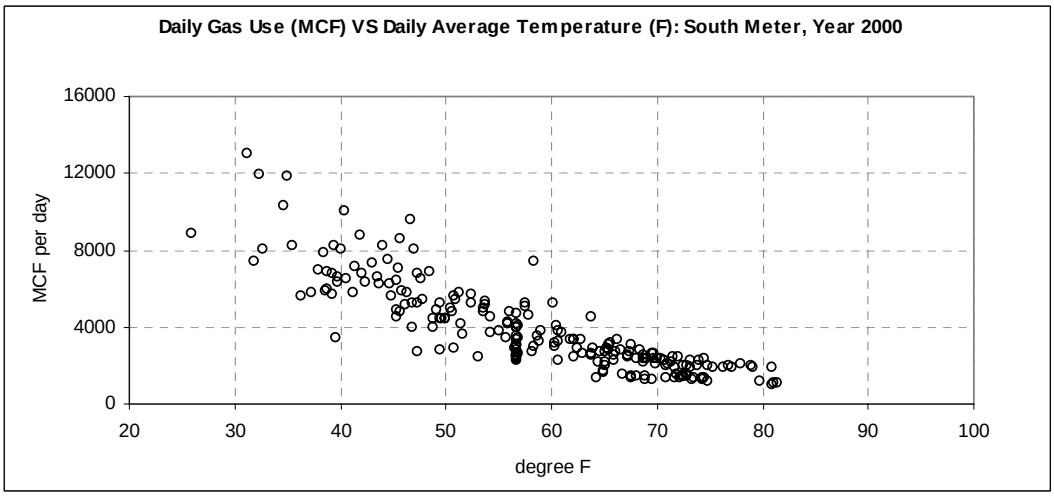


Figure 10.2-12:1999, 2000, 2001 and 2002 Daily Gas Use for West Meter vs Temperature (cont.)





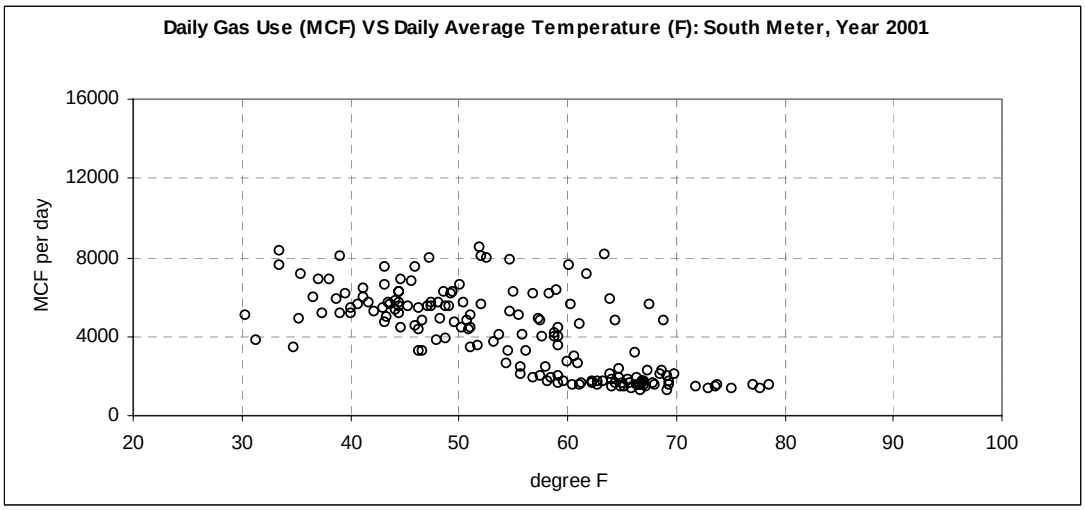


Figure 10.2-13: 1999, 2000, 2001 and 2002 Daily Gas Use for South Meter vs Temperature.

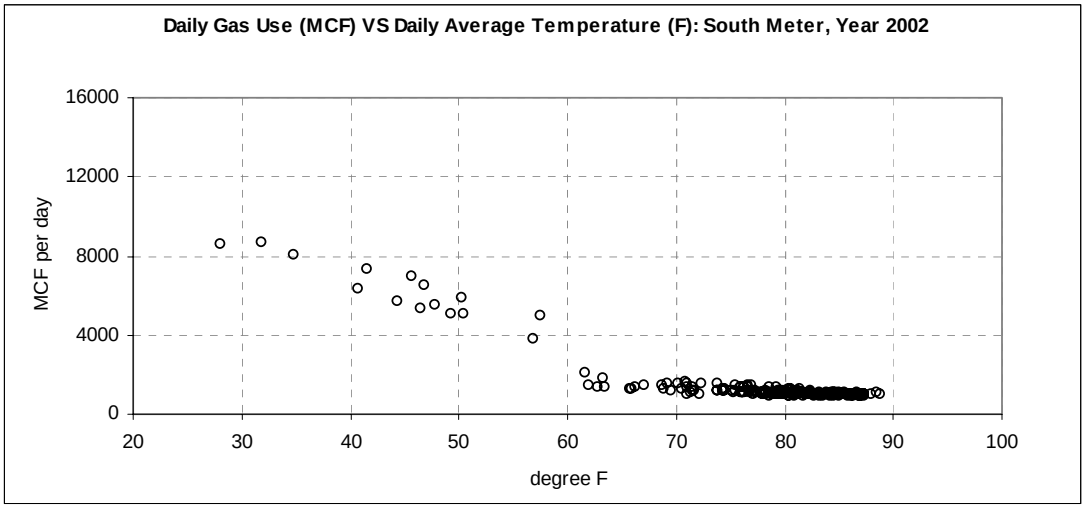
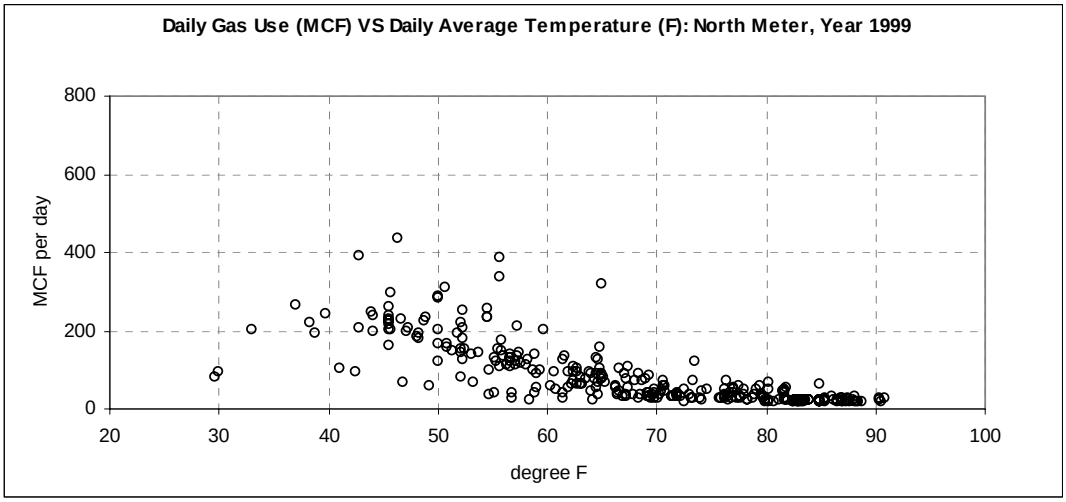
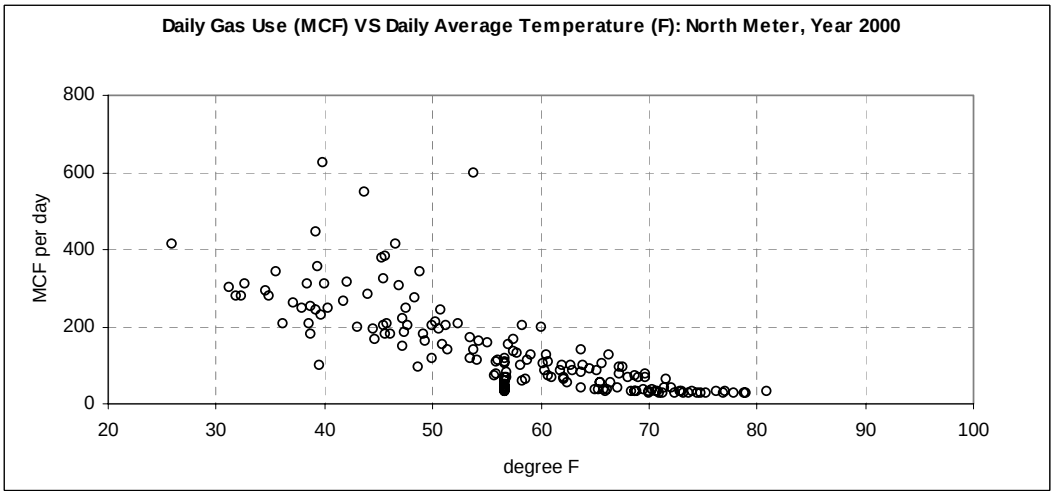


Figure 10.2-14: 1999, 2000, 2001 and 2002 Daily Gas Use for South Meter vs Temperature (cont.).





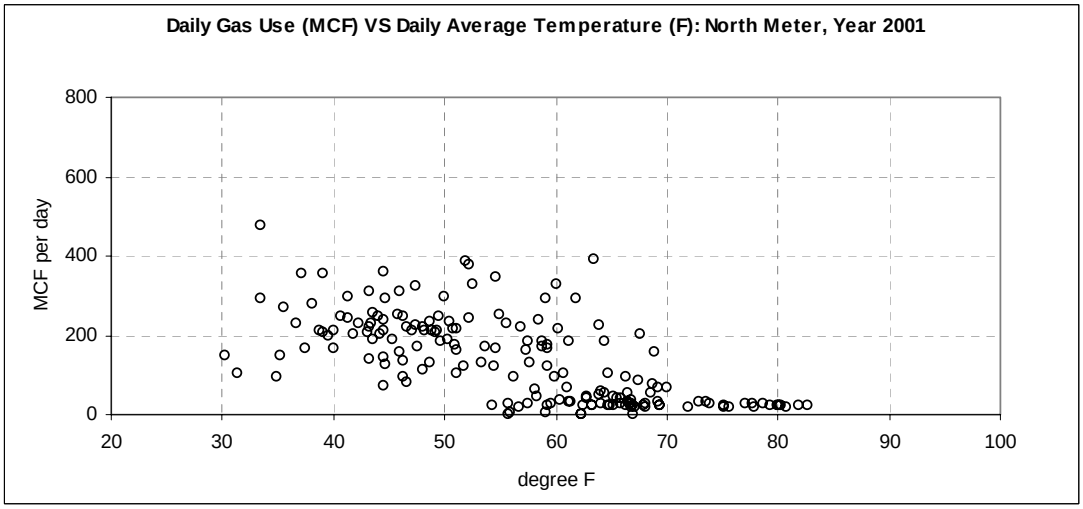


Figure 10.2-15: 1999, 2000, 2001, and 2002 Daily Gas Use for North Meter vs Temperature.

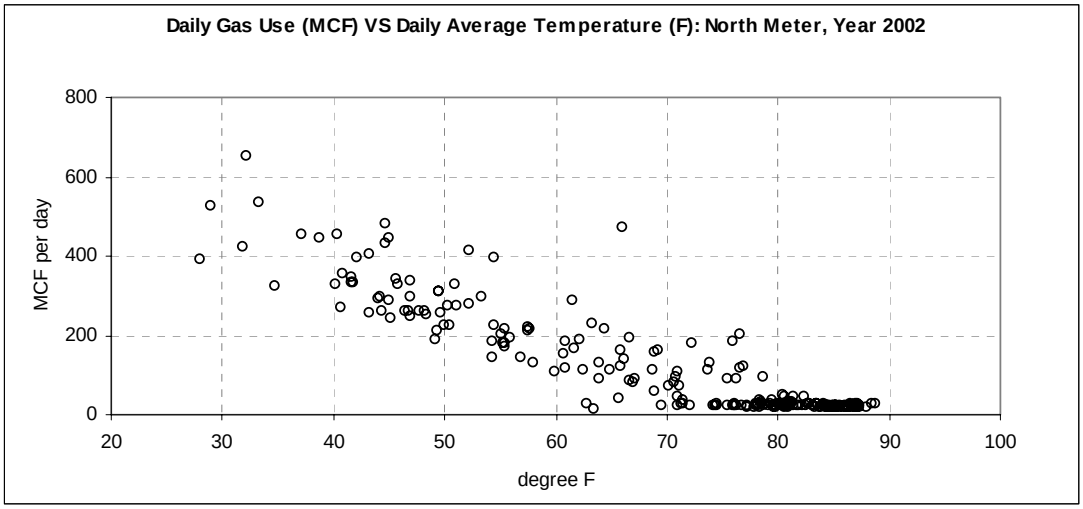
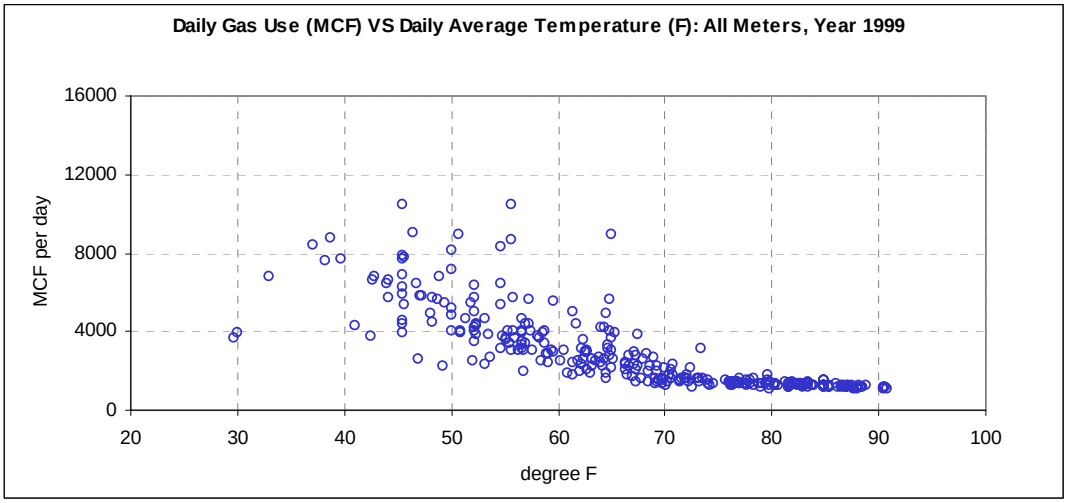
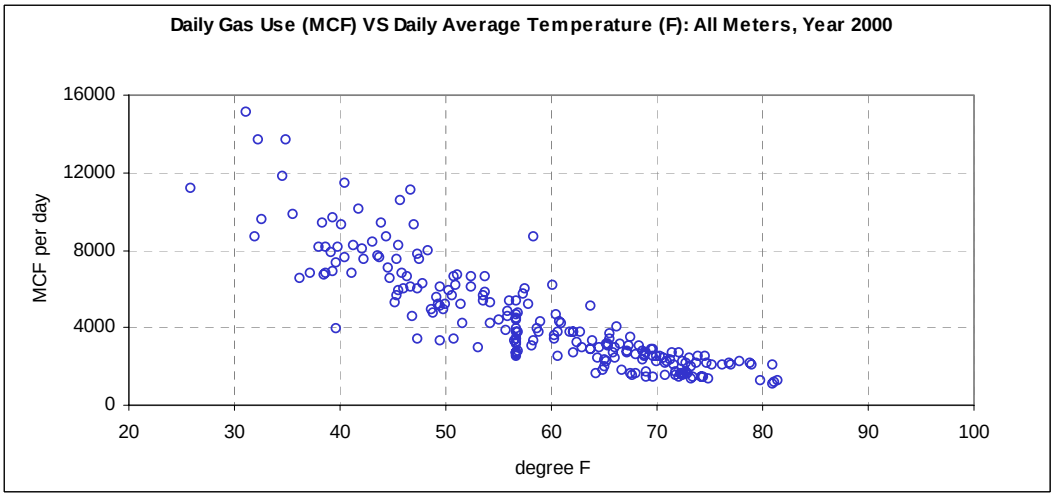


Figure 10.2-16: 1999, 2000, 2001, and 2002 Daily Gas Use for North Meter vs Temperature (cont.)





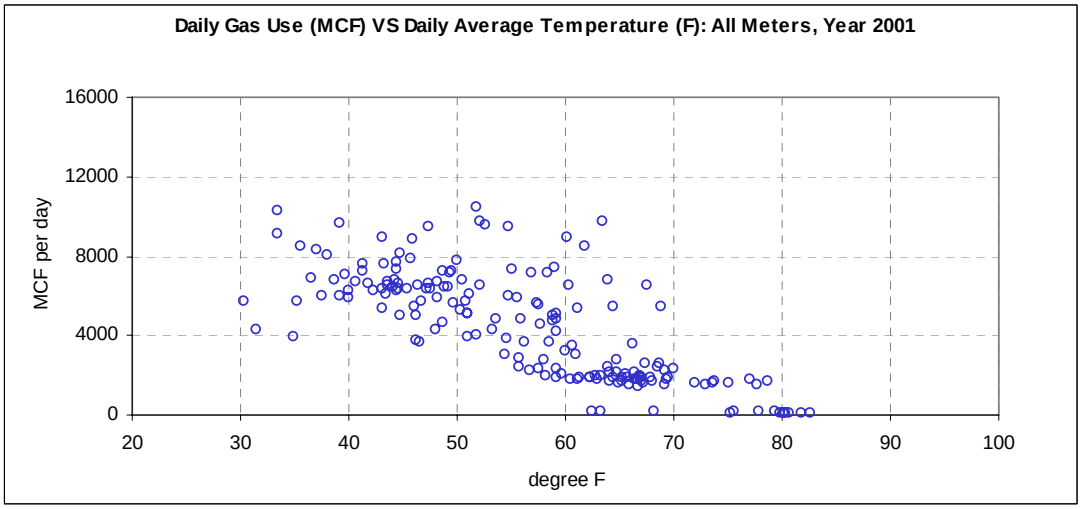


Figure 10.2-17: 1999, 2000, 2001 and 2002 Daily Gas Use for All Meters vs Temperature.

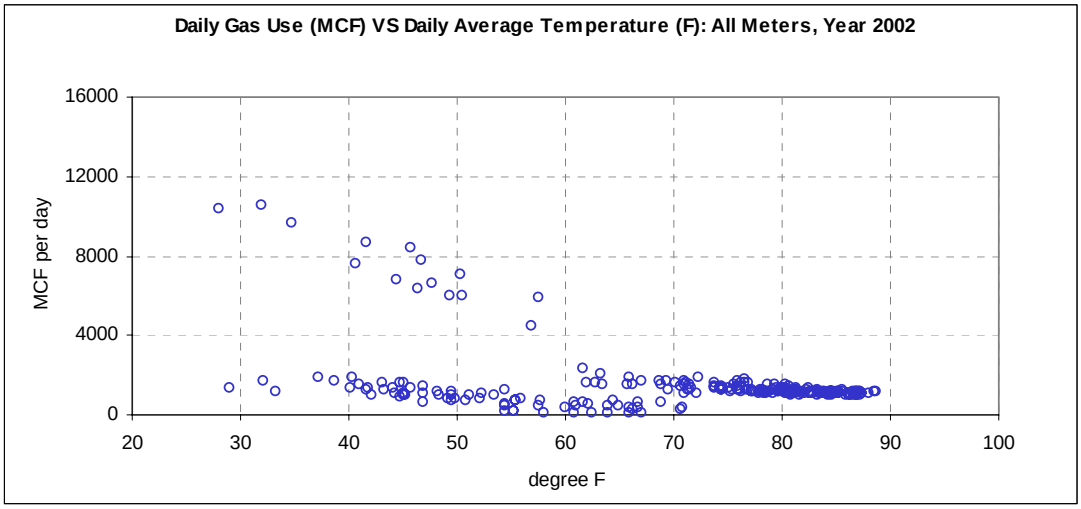


Figure 10.2-18: 1999, 2000, 2001 and 2002 Daily Gas Use for All Meters vs Temperature (cont.)

Table 10.2-1: Three-parameter Model for 1999-2002 Daily Average Monthly Gas Use for All Meters vs Temperature.

Path and name of input data file = Gas_Month.prn
Value of no-data flag = -99
Column number of group field = 3
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 2
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 1
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Gas_Month.prn
    Model type =           3P Heating
    Grouping column No =    3
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      2
    X1 column number =   1
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     35
          R2 =     0.669
       AdjR2 =     0.669
        RMSE =   1182.5442
     CV-RMSE =    41.524%
           p =     0.524
          DW =     0.952 (p>0)
          N1 =     26
          N2 =      9
         Ycp =    979.5070 (    303.6754)
          LS =   -153.9850 (     18.8415)
          RS =      0.0000 (      0.0000)
         Xcp =     74.5980 (      0.9351)
```

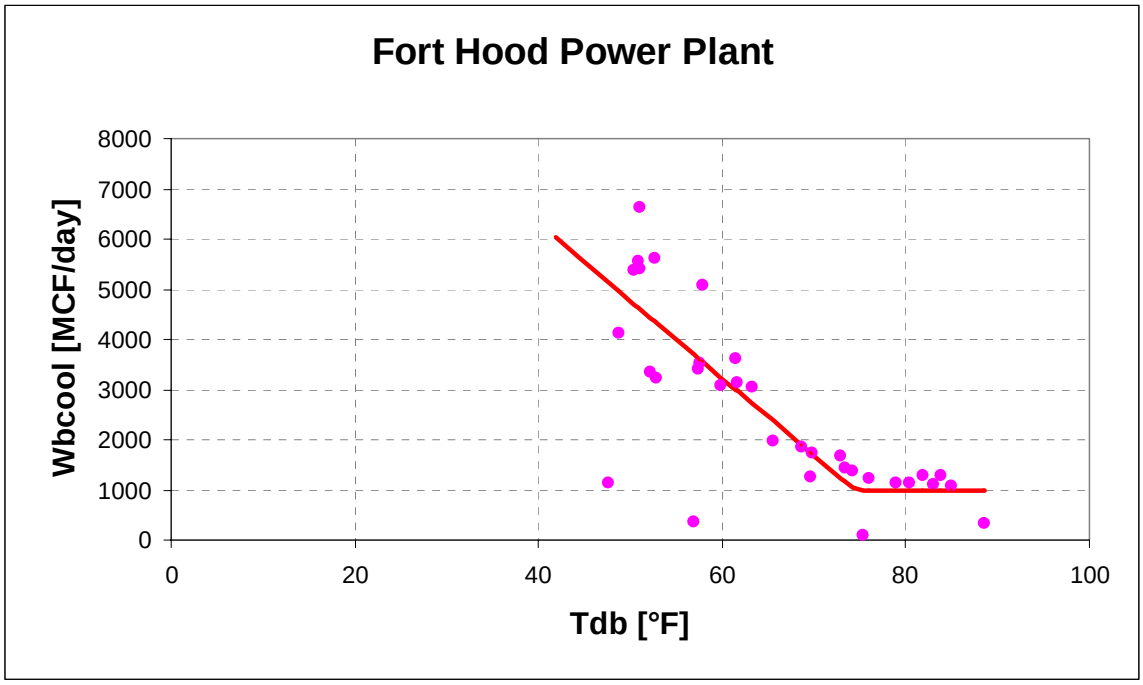


Figure 10.2-19: Three-parameter Model for 1999-2002 Daily Average Monthly Gas Use for All Meters vs Temperature.

Table 10.2-2: Three-parameter Model for 2001 Daily Gas Use for West Meter vs Temperature.

Path and name of input data file = Gas_DailyYear.prn
Value of no-data flag = -99
Column number of group field = 11
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 2
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 5
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Gas_DailyYear.prn
    Model type =           3P Heating
    Grouping column No =   11
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      2
    X1 column number =   5
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    179
          R2 =     0.492
       AdjR2 =     0.492
        RMSE =    236.4809
     CV-RMSE =    44.980%
           p =     0.690
          DW =     0.623 (p>0)
          N1 =    168
          N2 =     11
         Ycp =    123.1954 (     35.4512)
          LS =    -19.9884 (      1.5259)
          RS =      0.0000 (      0.0000)
         Xcp =     76.3504 (      1.0466)
```

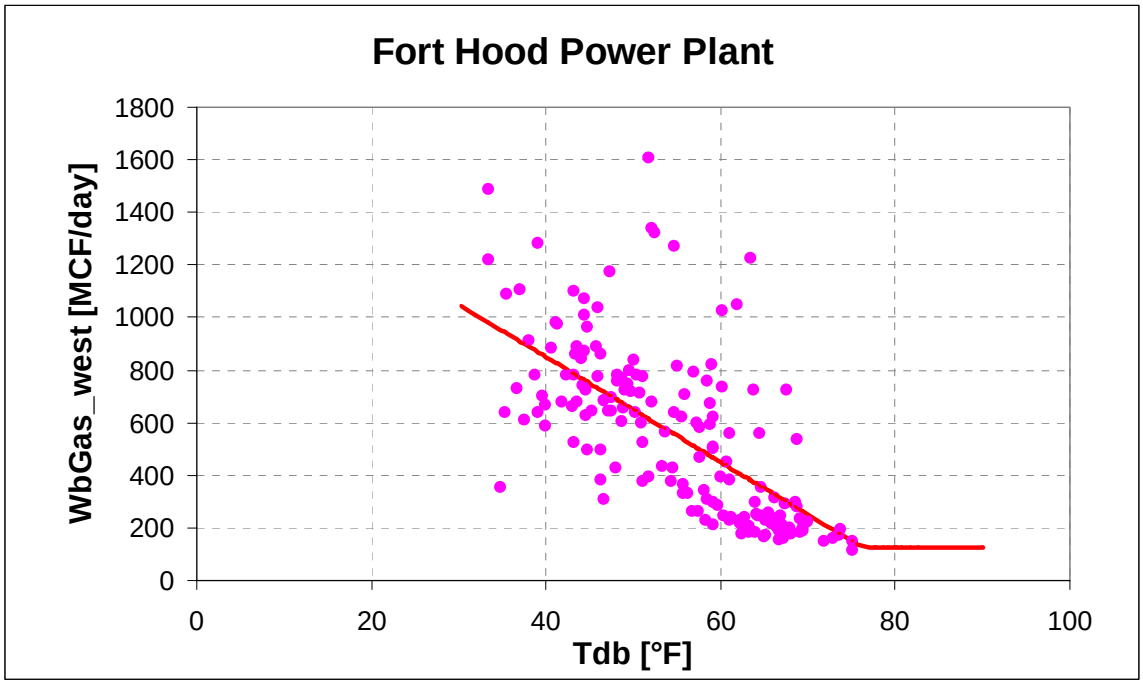


Figure 10.2-20: Three-parameter Model for 2001 Daily Gas Use for West Meter vs Temperature.

Table 10.2-3: Three-parameter Model for 2001 Daily Gas Use for South Meter vs Temperature.

Path and name of input data file = Gas_DailyYear.prn
Value of no-data flag = -99
Column number of group field = 11
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 3
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 5
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Gas_DailyYear.prn
    Model type =           3P Heating
    Grouping column No =   11
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      3
    X1 column number =   5
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    166
          R2 =     0.500
       AdjR2 =     0.500
        RMSE =   1475.5438
     CV-RMSE =    36.070%
           p =     0.749
          DW =     0.509 (p>0)
          N1 =    162
          N2 =      4
         Ycp =   1490.3719 (    233.0165)
          LS =   -136.6563 (     10.6642)
          RS =      0.0000 (      0.0000)
         Xcp =     73.8330 (      0.9674)
```

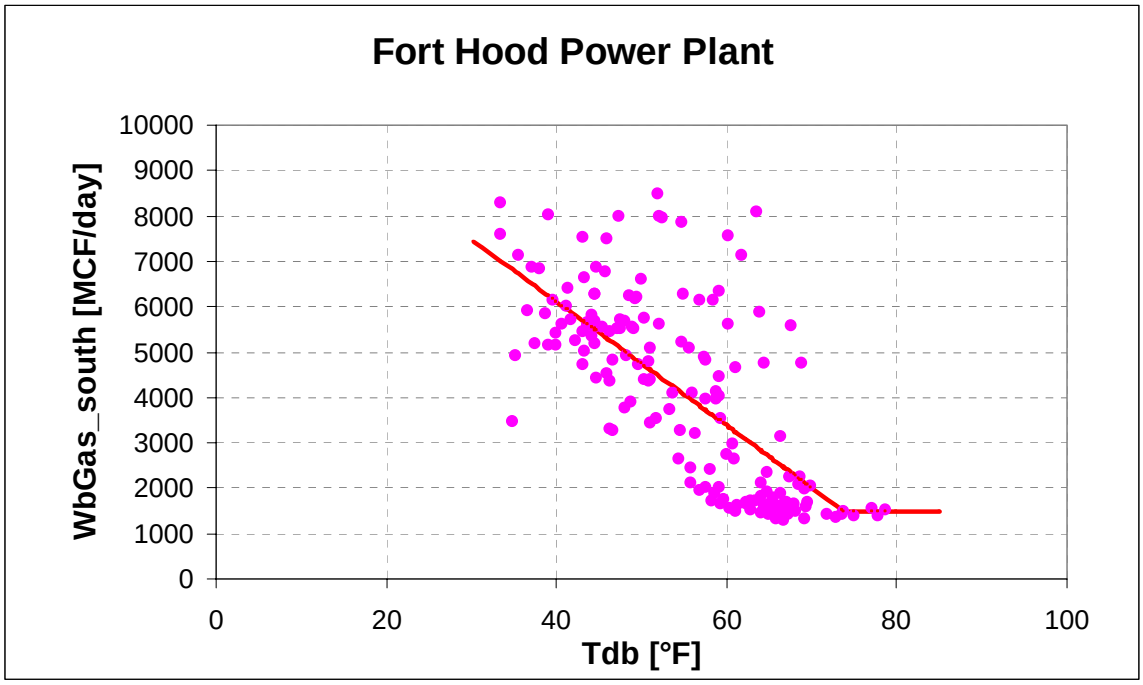


Figure 10.2-21: Three-parameter Model for 2001 Daily Gas Use for South Meter vs Temperature.

Table 10.2-4: Three-parameter Model for 2001 Daily Gas Use for North Meter vs Temperature.

Path and name of input data file = Gas_DailyYear.prn
Value of no-data flag = -99
Column number of group field = 11
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 4
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 5
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Gas_DailyYear.prn
    Model type =           3P Heating
    Grouping column No =   11
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      4
    X1 column number =   5
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    179
          R2 =     0.232
       AdjR2 =     0.232
        RMSE =    128.3171
     CV-RMSE =    88.394%
           p =     0.178
          DW =     1.640 (p>0)
          N1 =    168
          N2 =     11
         Ycp =     23.3006 (     19.2362)
          LS =     -6.0510 (      0.8280)
          RS =      0.0000 (      0.0000)
         Xcp =     76.3504 (      1.0466)
```

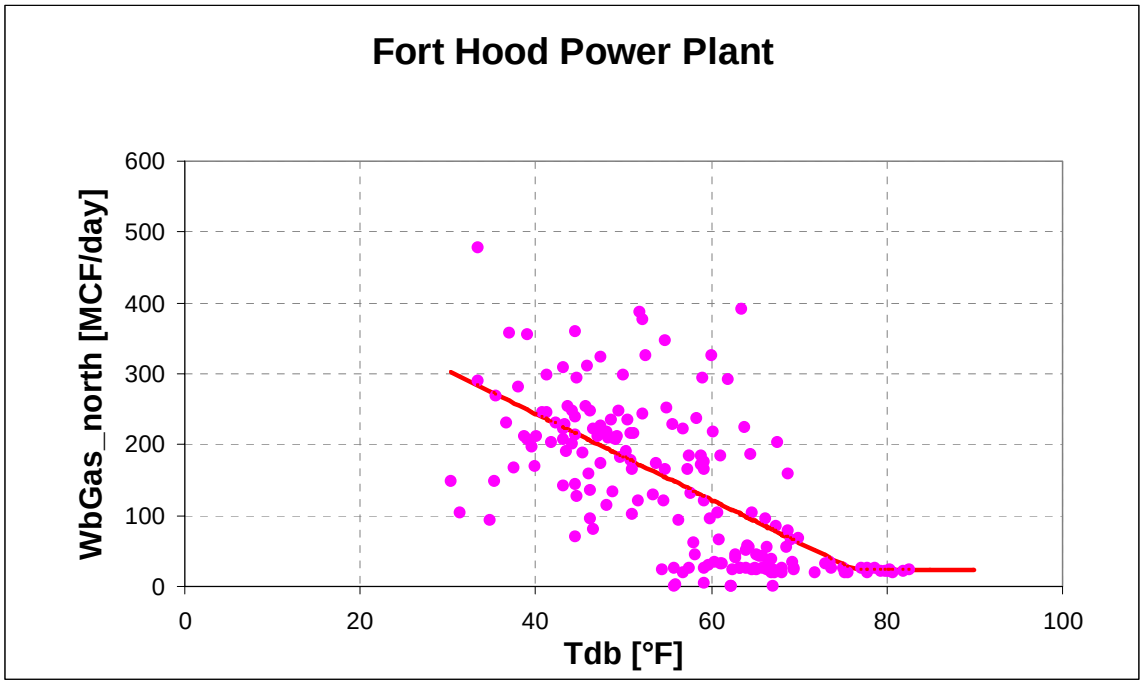


Figure 10.2-22: Three-parameter Model for 2001 Daily Gas Use for North Meter vs Temperature.

Table 10.2-5: Three-parameter Model for 2001 Daily Gas Use for All Meters vs Temperature.

Path and name of input data file = Gas_DailyYear.prn
Value of no-data flag = -99
Column number of group field = 11
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 5
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Gas_DailyYear.prn
    Model type =           3P Heating
    Grouping column No =   11
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   5
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    166
          R2 =     0.494
       AdjR2 =     0.494
        RMSE =   1776.2854
     CV-RMSE =    36.984%
           p =     0.737
          DW =     0.533 (p>0)
          N1 =    162
          N2 =      4
         Ycp =   1573.2291 (    290.2404)
          LS =   -161.6982 (     12.7874)
          RS =      0.0000 (      0.0000)
         Xcp =     74.8004 (      0.9674)
```

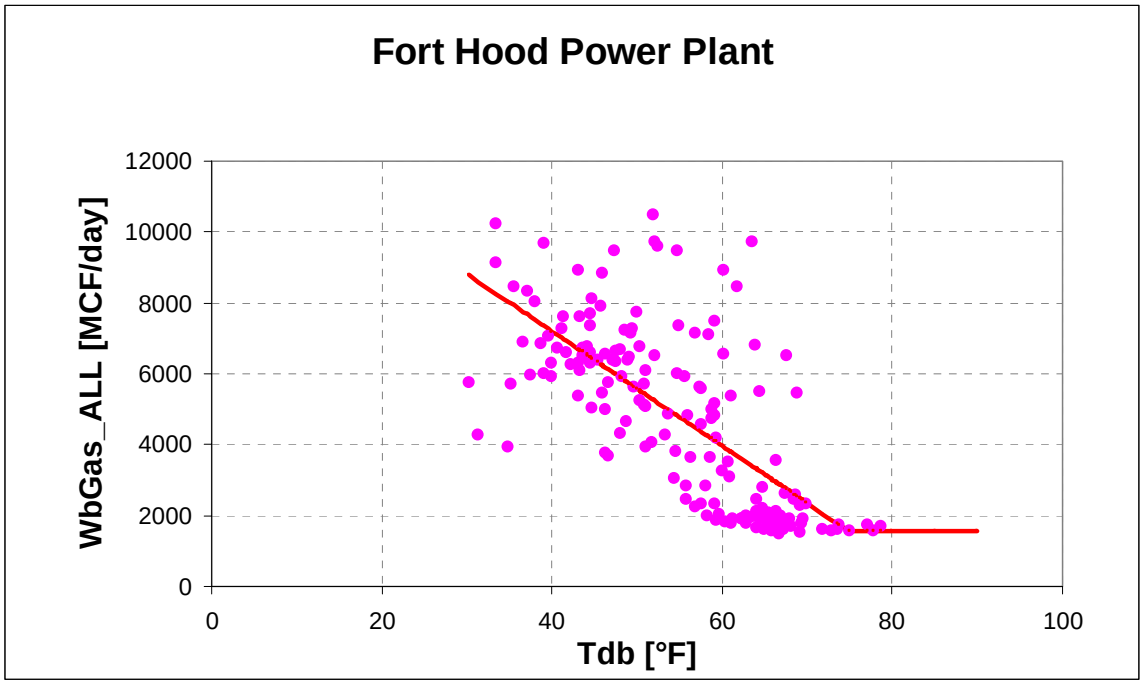


Figure 10.2-23: Three-parameter Model for 2001 Daily Gas Use for All Meters vs Temperature.

Table 10.2-6: Three-parameter Model for 2002 Daily Gas Use for West Meter vs Temperature.

Path and name of input data file = Gas_DailyYear.prn
Value of no-data flag = -99
Column number of group field = 11
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 7
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 10
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Gas_DailyYear.prn
    Model type =           3P Heating
    Grouping column No =   11
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      7
    X1 column number =  10
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    234
          R2 =     0.880
       AdjR2 =     0.880
        RMSE =    120.9244
     CV-RMSE =    39.640%
           p =     0.650
          DW =     0.703 (p>0)
          N1 =     84
          N2 =    150
         Ycp =    103.0362 (      9.3005)
          LS =    -29.4313 (      0.7138)
          RS =      0.0000 (      0.0000)
         Xcp =     70.5400 (      1.2140)
```

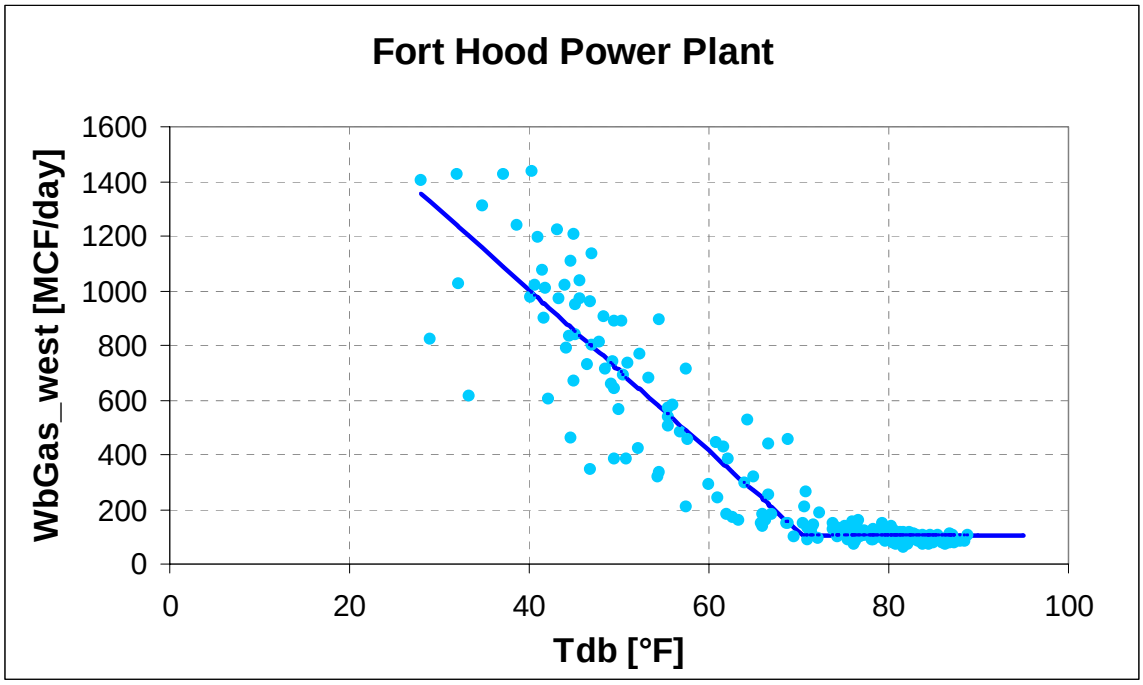


Figure 10.2-24: Three-parameter Model for 2002 Daily Gas Use for West Meter vs Temperature.

Table 10.2-7: Three-parameter Model for 2002 Daily Gas Use for South Meter vs Temperature.

Path and name of input data file = Gas_DailyYear.prn
Value of no-data flag = -99
Column number of group field = 11
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 8
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 10
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Gas_DailyYear.prn
    Model type =           3P Heating
    Grouping column No =   11
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      8
    X1 column number =  10
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    182
          R2 =     0.965
       AdjR2 =     0.965
        RMSE =    279.9135
     CV-RMSE =    18.233%
           p =     0.413
          DW =     1.173 (p>0)
          N1 =     24
          N2 =    158
         Ycp =   1085.3694 (     21.7198)
          LS =   -213.0941 (      3.0426)
          RS =      0.0000 (      0.0000)
         Xcp =     68.1120 (      1.2140)
```

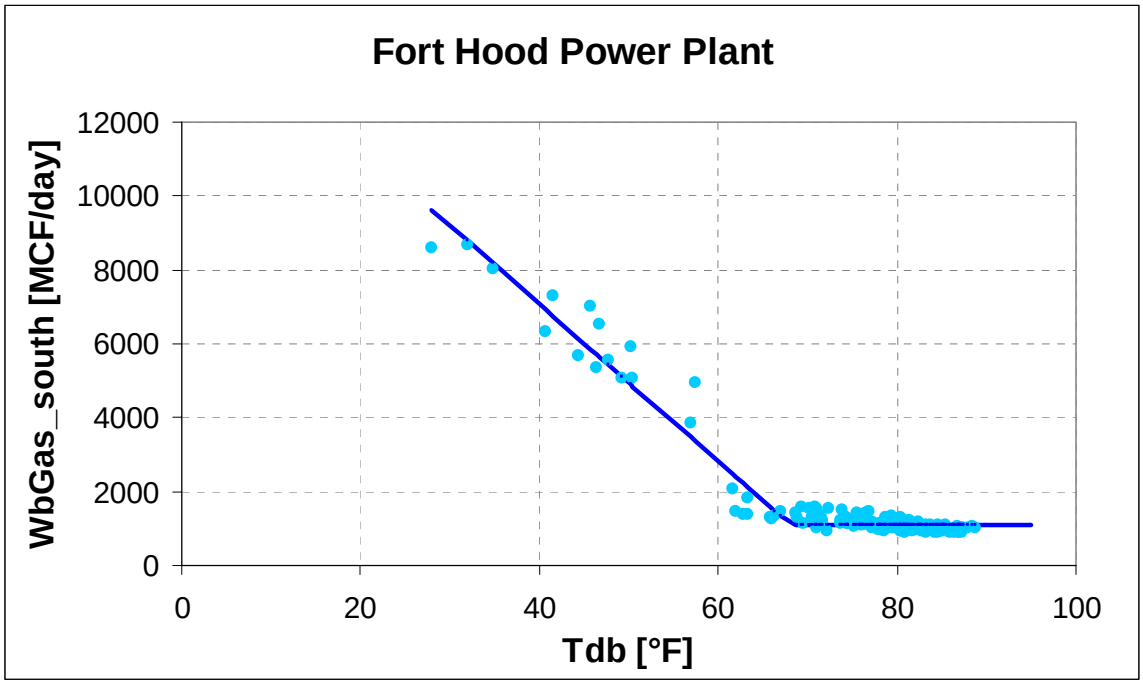


Figure 10.2-25: Three-parameter Model for 2002 Daily Gas Use for South Meter vs Temperature.

Table 10.2-8: Three-parameter Model for 2002 Daily Gas Use for North Meter vs Temperature.

Path and name of input data file = Gas_DailyYear.prn
Value of no-data flag = -99
Column number of group field = 11
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 9
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 10
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Gas_DailyYear.prn
    Model type =           3P Heating
    Grouping column No =   11
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      9
    X1 column number =  10
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    220
          R2 =     0.842
       AdjR2 =     0.842
        RMSE =     54.7069
     CV-RMSE =    43.134%
           p =     0.445
          DW =     1.108 (p>0)
          N1 =    126
          N2 =     94
         Ycp =     24.7211 (      4.7508)
          LS =     -9.0654 (      0.2659)
          RS =      0.0000 (      0.0000)
         Xcp =     77.8240 (      1.2140)
```

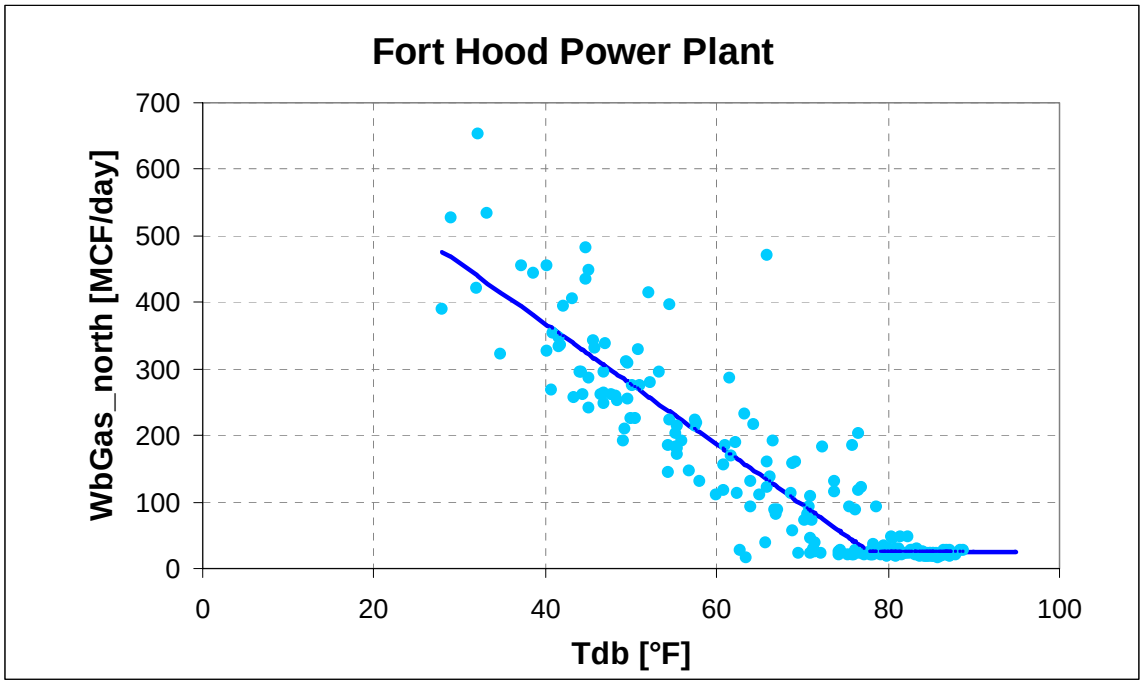


Figure 10.2-26: Three-parameter Model for 2002 Daily Gas Use for North Meter vs Temperature.

Table 10.2-9: Three-parameter Model for 2002 Daily Gas Use for All Meters vs Temperature.

Path and name of input data file = Gas_DailyYear.prn
Value of no-data flag = -99
Column number of group field = 11
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 6
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 10
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Gas_DailyYear2.prn
    Model type =           3P Heating
    Grouping column No =   11
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      6
    X1 column number =  10
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    182
          R2 =     0.966
       AdjR2 =     0.966
        RMSE =    333.5971
     CV-RMSE =    18.972%
           p =     0.417
          DW =     1.165 (p>0)
          N1 =     24
          N2 =    158
         Ycp =   1212.3336 (     25.8854)
          LS =   -258.6690 (      3.6262)
          RS =      0.0000 (      0.0000)
         Xcp =     68.1120 (      1.2140)
```

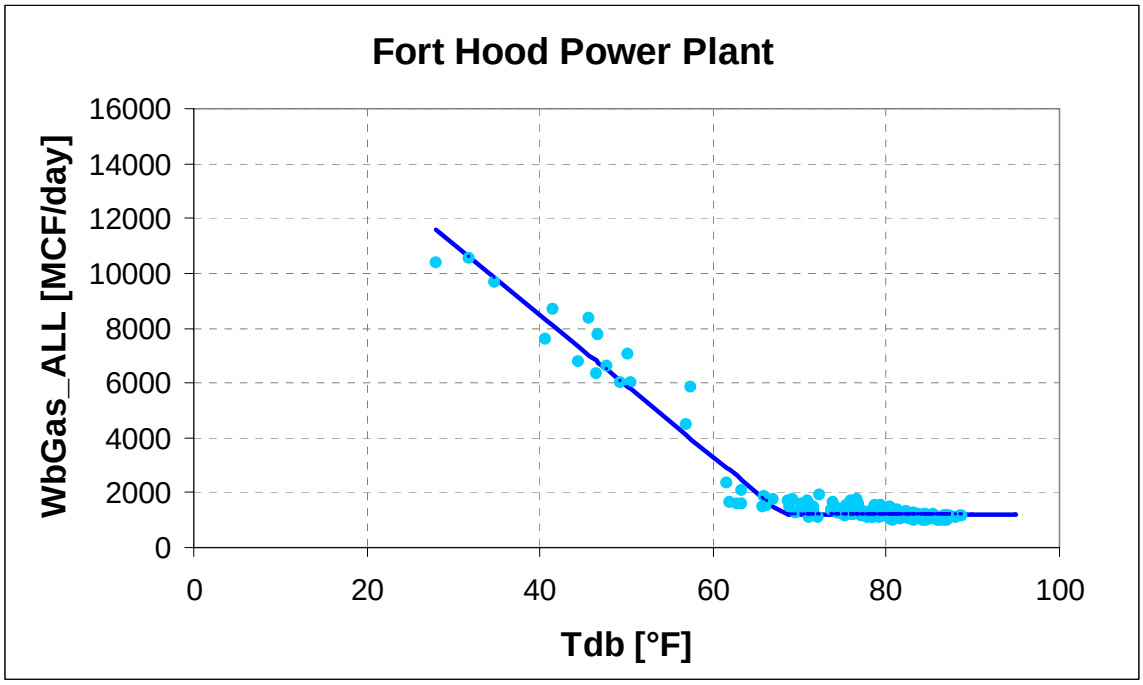


Figure 10.2-27: Three-parameter Model for 2002 Daily Gas Use for All Meters vs Temperature.

Table 10.2-10: Three-parameterModel for 1999, 2000, 2001 and 2002 Daily Gas Use for All Meters vs Temperature.

Path and name of input data file = GasALLDaily.prn
Value of no-data flag = -99
Column number of group field = 9
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 2
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  GasALLDaily.prn
    Model type =           3P Heating
    Grouping column No =    9
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   2
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    299
          R2 =     0.672
       AdjR2 =     0.672
        RMSE =   1152.5748
     CV-RMSE =    39.487%
           p =     0.656
          DW =     0.689 (p>0)
          N1 =    202
          N2 =     97
         Ycp =   1299.4341 (     93.5349)
          LS =   -150.4830 (      6.0975)
          RS =      0.0000 (      0.0000)
         Xcp =     74.8884 (      1.2232)
```

Path and name of input data file = GasALLDaily.prn
Value of no-data flag = -99
Column number of group field = 9
Value of valid group field = 1

```
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 3
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 4
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  GasALLDaily.prn
    Model type =           3P Heating
    Grouping column No =    9
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      3
    X1 column number =   4
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
          N =    218
         R2 =     0.785
      AdjR2 =     0.785
       RMSE =   1269.1332
     CV-RMSE =    28.238%
          p =     0.587
         DW =     0.814 (p>0)
         N1 =    160
         N2 =     58
        Ycp =   1982.2001 (    123.9997)
         LS =   -222.1120 (      7.9017)
         RS =      0.0000 (      0.0000)
        Xcp =     68.0856 (      1.1112)

Path and name of input data file = GasALLDaily.prn
Value of no-data flag = -99
Column number of group field = 9
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 5
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 6
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
```

Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  GasALLDaily.prn
    Model type =           3P Heating
    Grouping column No =    9
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      5
    X1 column number =   6
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    166
          R2 =     0.494
       AdjR2 =     0.494
        RMSE =   1776.2854
     CV-RMSE =    36.984%
           p =     0.737
          DW =     0.533 (p>0)
          N1 =    162
          N2 =      4
         Ycp =   1573.2291 (    290.2404)
          LS =   -161.6982 (     12.7874)
          RS =      0.0000 (      0.0000)
         Xcp =     74.8004 (      0.9674)
```

Path and name of input data file = GasALLDaily2.prn
Value of no-data flag = -99
Column number of group field = 9
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 7
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 8
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
```

```
*****************************************
   Input data file name =  GasALLDaily2.prn
   Model type =           3P Heating
   Grouping column No =    9
   Value for grouping =    1
   Residual mode =         1
   # of X(Indep.) Var =    1
   Y1 column number =      7
   X1 column number =   8
   X2 column number =   0 (unused)
   X3 column number =   0 (unused)
   X4 column number =   0 (unused)
   X5 column number =   0 (unused)
   X6 column number =   0 (unused)
*****************************************
   Regression Results
          N =    182
         R2 =     0.966
      AdjR2 =     0.966
       RMSE =    333.5971
     CV-RMSE =    18.972%
          p =     0.417
         DW =     1.165 (p>0)
         N1 =     24
         N2 =    158
        Ycp =   1212.3336 (     25.8854)
         LS =   -258.6690 (      3.6262)
         RS =      0.0000 (      0.0000)
        Xcp =     68.1120 (      1.2140)
```

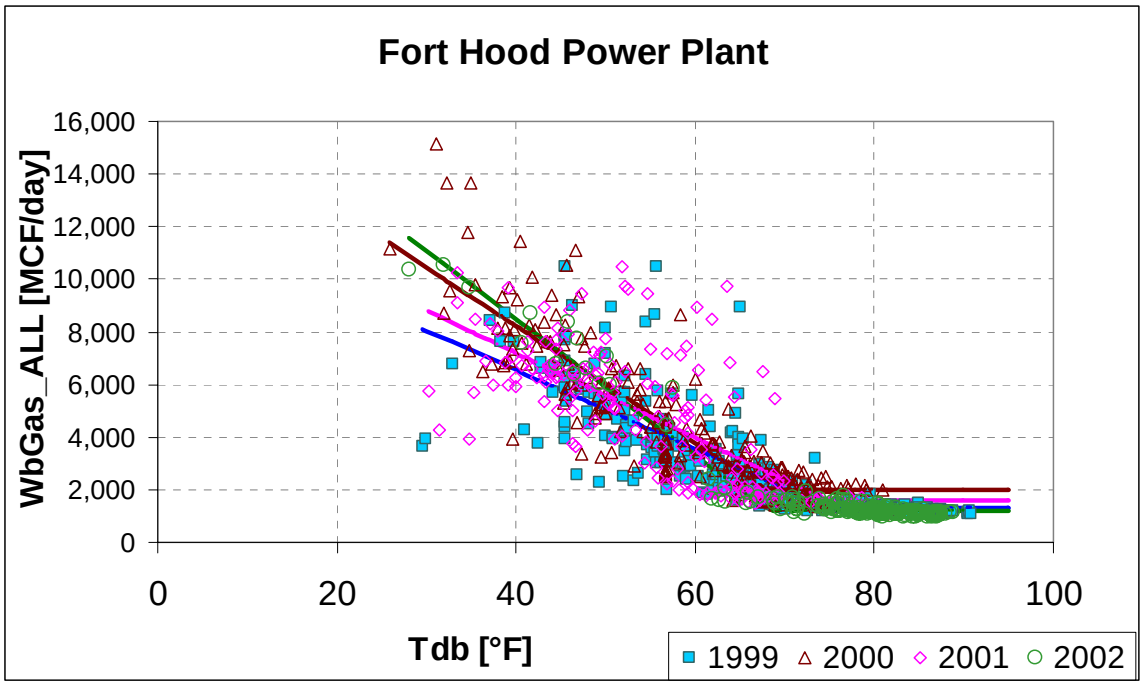


Figure 10.2-28: Three-parameterModel for 1999, 2000, 2001 and 2002 Daily Gas Use for All Meters vs Temperature.

Table 10.2-11: Three-parameterModel for Combined 1999, 2000, 2001 and 2002 Daily Gas Use for All Meters vs Temperature.

Path and name of input data file = GasALLDaily2_.prn
Value of no-data flag = -99
Column number of group field = 3
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable = 1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 2
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  GasALLDaily2_.prn
    Model type =           3P Heating
    Grouping column No =    3
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   2
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    865
          R2 =     0.751
       AdjR2 =     0.751
        RMSE =   1269.4371
     CV-RMSE =    36.974%
           p =     0.673
          DW =     0.653 (p>0)
          N1 =    602
          N2 =    263
         Ycp =   1258.4446 (     60.6866)
          LS =   -183.1182 (      3.5919)
          RS =      0.0000 (      0.0000)
         Xcp =     73.9082 (      1.2986)
```

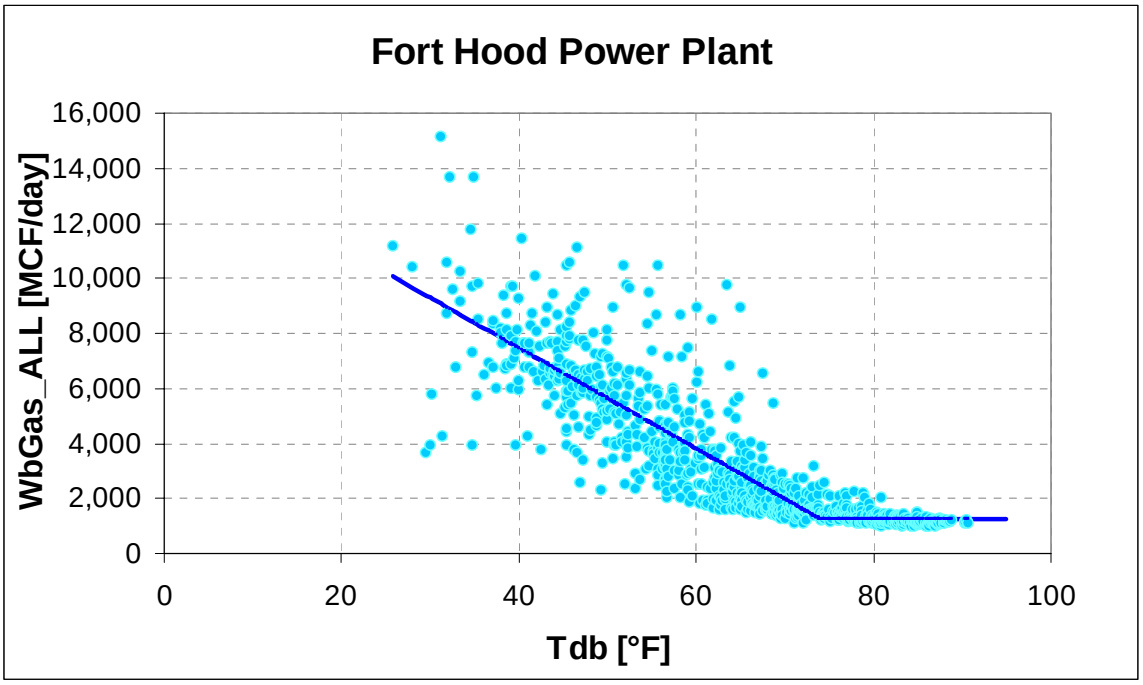


Figure 10.2-29: Three-parameterModel for Combined 1999, 2000, 2001 and 2002 Daily Gas Use for All Meters vs Temperature.

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12. APPENDIX

This section of the report contains information about the channels that were being monitored at the thermal plant and the baseline models for the manual readings from 87000 block buildings.

12.1. ESL Polling and Database Information.

The following information contains the ESL's Channel Identification Table (CHID) for loggers that have been assigned to the Ft. Hood thermal plant. The numbers in the first column are the channel number of the individual data channels in the ESL's Informix database. The "cp" indicates if the channel is current, followed by the channel description and other information.

12.1.1. Channel Identification Tables lstaraxp% listchid #938 - 3279 - Ft Hood - Central Thermal Power Plant (8700)

Chid	cp	Description
4342	-1	CHIL 1 ELECTRIC (power, B1C1/B1C1)
4343	-1	CHIL 2 ELECTRIC (power, A1C1/A1C1)
4341	-1	CHIL 1 ELECTRIC (power, A1C1/A1C1)
4344	-1	CHIL 2 ELECTRIC (power, B1C1/B1C1)
4346	-1	BOILER 1 GAS
4345	-1	WHOLE BLDG ELECT
4623	1	CNTRL PLNT ELECT (power, A1N1/A1N1)
4624	2	CNTRL PLNT ELECT (power, B1N1/B1N1)
4625	3	CNTRL PLNT ELECT (power, C1N1/C1N1)
4626	4	CHILLER 1 ELECT (power, A1B1/A1B1)
4627	5	CHILLER 1 ELECT (power, C1B1/C1B1)
4628	6	CHILLER 2 ELECT (power, A1B1/A1B1)
4629	7	CHILLER 2 ELECT (power, C1B1/C1B1)
4630	8	CNTRL PLNT ELECT (kva, A1N1/A1N1)
4631	9	CNTRL PLNT ELECT (kva, B1N1/B1N1)
4632	10	CNTRL PLNT ELECT (kva, C1N1/C1N1)
4633	11	CHILLER 1 ELECT (kva, A1B1/A1B1)
4634	12	CHILLER 1 ELECT (kva, C1B1/C1B1)
4635	13	CHILLER 2 ELECT (kva, A1B1/A1B1)
4636	14	CHILLER 2 ELECT (kva, C1B1/C1B1)
4637	15	CHILLED WTR FLOW
4638	16	CHW SUPPLY TEMP
4639	17	CHW RET TEMP
4640	18	OUTSIDE TEMP
4641	19	OUTSIDE RH
4774	20	STEAM FLOW ENRGY
4775	21	STEAM TEMP
4850	22	STEAM PRESSURE
4851	23	COND WTR RETURN
4642	24	CNTRL PLNT GAS
4643	25	CHILL WTR BTU USR

12.1.2. Channel Identification Tables lstaraxp% listchid #947 - 10043 - III Corps

Chid	cp	Description
4776	1	MAIN 1 ELECT (power, A1N1/A1N1)
4777	2	MAIN 1 ELECT (power, B1N1/B1N1)
4778	3	MAIN 1 ELECT (power, C1N1/C1N1)
4779	4	MAIN 2 ELECT (power, A2N2/A2N2)
4780	5	MAIN 2 ELECT (power, B2N2/B2N2)
4781	6	MAIN 2 ELECT (power, C2N2/C2N2)
4782	7	CHILLER 1 ELECT (power, A1B1/A1B1)
4783	8	CHILLER 1 ELECT (power, C1B1/C1B1)
4784	9	CHILLER 2 ELECT (power, A1B1/A1B1)
4785	10	CHILLER 2 ELECT (power, C1B1/C1B1)
4786	11	CHILLER 3 ELECT (power, A1B1/A1B1)
4787	12	CHILLER 3 ELECT (power, C1B1/C1B1)
4788	13	CHILLER 4 ELECT (power, A1B1/A1B1)
4789	14	CHILLER 4 ELECT (power, C1B1/C1B1)
4790	15	MCC ELECT (power, A2B2/A2B2)
4791	16	MCC ELECT (power, C2B2/C2B2)
4792	17	WHOLE BLDG GAS

12.1.3. Channel Identification Tables lstaraxp% listchid# 939 - 3832 - Darnall Hospital #1

Chid	cp	Description
4295	1	WBE METER #3
4296	2	WBE METER #4

12.1.4. Channel Identification Tables lstaraxp% listchid# 940 - 3831 - Darnall Hosptial #2

Chid	cp	Description
4202	-1	CHILLER#2 RT-TMP
4179	-1	CHILLER #1 ELE A (kva, A1B1/A1B1)
4180	-1	CHILLER #1 ELE C (kva, C1B1/C1B1)
4183	-1	CHILLER #3 ELE A (kva, A1B1/A1B1)
4184	-1	CHILLER #3 ELE C (kva, C1B1/C1B1)
4185	-1	MCC PHASE A (kva, A1B1/A1B1)
4186	-1	MCC PHASE C (kva, C1B1/C1B1)
4187	-1	LIL' MCC PHASE A (kva, A1B1/A1B1)
4188	-1	LIL' MCC PHASE C (kva, C1B1/C1B1)
4189	-1	CHILLER #1 ELE A (volts, A1B1/A1B1)
4190	-1	CHILLER #1 ELE C (volts, C1B1/C1B1)
4191	-1	CHILLER #2 ELE A (volts, A1B1/A1B1)
4192	-1	CHILLER #2 ELE C (volts, C1B1/C1B1)
4193	-1	CHILLER #3 ELE A (volts, A1B1/A1B1)
4194	-1	CHILLER #3 ELE C (volts, C1B1/C1B1)
4195	-1	MCC PHASE A (volts, A1B1/A1B1)
4196	-1	MCC PHASE C (volts, C1B1/C1B1)
4197	-1	LIL' MCC PHASE A (volts, A1B1/A1B1)
4198	-1	LIL' MCC PHASE C (volts, C1B1/C1B1)
4181	-1	CHILLER #2 ELE A (kva, A1B1/A1B1)
4201	-1	CHILLER#2 SP-TMP
4199	-1	CHILLER#1 SP-TMP
4200	-1	CHILLER#1 RT-TMP
4182	-1	CHILLER #2 ELE C (kva, C1B1/C1B1)
4208	-1	WBE METER #4
4207	-1	WBE METER #3
4204	-1	CHILLER#3 RT-TMP
4203	-1	CHILLER#3 SP-TMP
4169	1	CHILLER #1 ELE A (power, A1B1/A1B1)
4170	2	CHILLER #1 ELE C (power, C1B1/C1B1)
4171	3	CHILLER #2 ELE A (power, A1B1/A1B1)
4172	4	CHILLER #2 ELE C (power, C1B1/C1B1)
4173	5	CHILLER #3 ELE A (power, A1B1/A1B1)
4174	6	CHILLER #3 ELE C (power, C1B1/C1B1)
4175	7	MCC PHASE A (power, A1B1/A1B1)
4176	8	MCC PHASE C (power, C1B1/C1B1)
4177	9	LIL' MCC PHASE A (power, A1B1/A1B1)
4178	10	LIL' MCC PHASE C (power, C1B1/C1B1)
4297	11	CHILLER#1 SP-TMP
4298	12	CHILLER#1 RT-TMP
4299	13	CHILLER#2 SP-TMP
4300	14	CHILLER#2 RT-TMP
4301	15	CHILLER#3 SP-TMP
4302	16	CHILLER#3 RT-TMP
4205	17	WBE METER #1
4206	18	WBE METER #2
4303	19	GAS OTHER
4209	20	WBGAS

12.1.5. Channel Identification Tables lstaraxp% listchid#941 - 1141 - Main Electrical Substation #1

Chid	cp	Description
1867	-1	SW 5 B PHASE (power, B1N1/B1N1)
1868	-1	SW 5 C PHASE (power, C1N1/C1N1)
1869	-1	SW 4 A PHASE (power, A1N1/A1N1)
1870	-1	SW 4 B PHASE (power, B1N1/B1N1)
1871	-1	SW 4 C PHASE (power, C1N1/C1N1)
1872	-1	SW 15 A PHASE (power, A1N1/A1N1)
1873	-1	SW 15 C PHASE (power, B1N1/B1N1)
1874	-1	SW 15 C PHASE (power, C1N1/C1N1)
1875	-1	SW 12 A PHASE (power, A1N1/A1N1)
1876	-1	SW 12 B PHASE (power, B1N1/B1N1)
1877	-1	SW 12 C PHASE (power, C1N1/C1N1)
1878	-1	SW 3 A PHASE (power, A2N1/A2N1)
1879	-1	SW 3 B PHASE (power, B2N1/B2N1)
1880	-1	SW 3 C PHASE (power, C2N1/C2N1)
1881	-1	SW 5 A PHASE (kva, A1N1/A1N1)
1882	-1	SW 5 B PHASE (kva, B1N1/B1N1)
1883	-1	SW 5 C PHASE (kva, C1N1/C1N1)
1884	-1	SW 4 A PHASE (kva, A1N1/A1N1)
1885	-1	SW 4 B PHASE (kva, B1N1/B1N1)
1886	-1	SW 4 C PHASE (kva, C1N1/C1N1)
1887	-1	SW 15 A PHASE (kva, A1N1/A1N1)
1888	-1	SW 15 C PHASE (kva, B1N1/B1N1)
1889	-1	SW 15 C PHASE (kva, C1N1/C1N1)
1890	-1	SW 12 A PHASE (kva, A1N1/A1N1)
1891	-1	SW 12 B PHASE (kva, B1N1/B1N1)
1892	-1	SW 12 C PHASE (kva, C1N1/C1N1)
1893	-1	SW 3 A PHASE (kva, A2N1/A2N1)
1894	-1	SW 3 B PHASE (kva, B2N1/B2N1)
1895	-1	SW 3 C PHASE (kva, C2N1/C2N1)
1896	-1	SW 5 A PHASE (volts, A1N1/A1N1)
1897	-1	SW 5 B PHASE (volts, B1N1/B1N1)
1898	-1	SW 5 C PHASE (volts, C1N1/C1N1)
1899	-1	SW 3 A PHASE (volts, A2N1/A2N1)
1900	-1	SW 3 B PHASE (volts, B2N1/B2N1)
1901	-1	SW 3 C PHASE (volts, C2N1/C2N1)
4826	-1	CIRCUIT BKR 6
4814	-1	CIRCUIT BKR 5
4815	-1	CIRCUIT BKR 4
4816	-1	CIRCUIT BKR 8
4817	-1	CIRCUIT BKR 15
4818	-1	CIRCUIT BKR 12
4819	-1	CIRCUIT BKR 3
4820	-1	CIRCUIT BKR 10
1866	-1	SW 5 A PHASE (power, A1N1/A1N1)
4821	-1	CIRCUIT BKR 2
4903	-1	CIRCUIT BKR 13 (amps, A1N1/A1N1)
4822	-1	CIRCUIT BKR 11
4823	-1	CIRCUIT BKR 9
4824	-1	CIRCUIT BKR 13
4825	-1	CIRCUIT BKR 1

4827	-1	CIRCUIT BKR 7
4828	-1	CIRCUIT BKR 14
4829	-1	CIRCUIT BKR 16
4884	-1	CIRCUIT BKR 13 (power, A1N1/A1N1)
4869	1	CIRCUIT BKR 5 (power, A1N1/A1N1)
4870	2	CIRCUIT BKR 5 (power, B1N1/B1N1)
4871	3	CIRCUIT BKR 5 (power, C1N1/C1N1)
4872	4	CIRCUIT BKR 4 (power, A1N1/A1N1)
4873	5	CIRCUIT BKR 4 (power, B1N1/B1N1)
4874	6	CIRCUIT BKR 4 (power, C1N1/C1N1)
4875	7	CIRCUIT BKR 8 (power, A1N1/A1N1)
4876	8	CIRCUIT BKR 8 (power, B1N1/B1N1)
4877	9	CIRCUIT BKR 8 (power, C1N1/C1N1)
4878	10	CIRCUIT BKR 15 (power, A1N1/A1N1)
4879	11	CIRCUIT BKR 15 (power, B1N1/B1N1)
4880	12	CIRCUIT BKR 15 (power, C1N1/C1N1)
4881	13	CIRCUIT BKR 12 (power, A1N1/A1N1)
4882	14	CIRCUIT BKR 12 (power, B1N1/B1N1)
4883	15	CIRCUIT BKR 12 (power, C1N1/C1N1)
4947	16	CIRCUIT BKR 3 (power, A1N1/A1N1)
4885	17	CIRCUIT BKR 5 (volts, A1N1/A1N1)
4886	18	CIRCUIT BKR 5 (volts, B1N1/B1N1)
4887	19	CIRCUIT BKR 5 (volts, C1N1/C1N1)
4888	20	CIRCUIT BKR 5 (amps, A1N1/A1N1)
4889	21	CIRCUIT BKR 5 (amps, B1N1/B1N1)
4890	22	CIRCUIT BKR 5 (amps, C1N1/C1N1)
4891	23	CIRCUIT BKR 4 (amps, A1N1/A1N1)
4892	24	CIRCUIT BKR 4 (amps, B1N1/B1N1)
4893	25	CIRCUIT BKR 4 (amps, C1N1/C1N1)
4894	26	CIRCUIT BKR 8 (amps, A1N1/A1N1)
4895	27	CIRCUIT BKR 8 (amps, B1N1/B1N1)
4896	28	CIRCUIT BKR 8 (amps, C1N1/C1N1)
4897	29	CIRCUIT BKR 15 (amps, A1N1/A1N1)
4898	30	CIRCUIT BKR 15 (amps, B1N1/B1N1)
4899	31	CIRCUIT BKR 15 (amps, C1N1/C1N1)
4900	32	CIRCUIT BKR 12 (amps, A1N1/A1N1)
4901	33	CIRCUIT BKR 12 (amps, B1N1/B1N1)
4902	34	CIRCUIT BKR 12 (amps, C1N1/C1N1)
4948	35	CIRCUIT BKR 3 (amps, A1N1/A1N1)

12.1.6. Channel Identification Tables lstaraxp% listchid#946 - 1146 - Main Electrical Substation #2

Chid	cp	Description
1903	-1	SW 10 B PHASE (power, B2N2/B2N2)
1904	-1	SW 10 B PHASE (power, C2N2/C2N2)
1905	-1	SW 2 A PHASE (power, A2N2/A2N2)
1906	-1	SW 2 B PHASE (power, B2N2/B2N2)
1907	-1	SW 2 C PHASE (power, C2N2/C2N2)
1908	-1	SW 11 A PHASE (power, A1N1/A1N1)
1909	-1	SW 11 B PHASE (power, B1N1/B1N1)
1910	-1	SW 11 C PHASE (power, C1N1/C1N1)
1911	-1	SW 9 A PHASE (power, A1N1/A1N1)
1912	-1	SW 9 B PHASE (power, B1N1/B1N1)
1913	-1	SW 9 C PHASE (power, C1N1/C1N1)
1914	-1	SW 13 C PHASE (power, C1N1/C1N1)
1915	-1	SW 13 B PHASE (power, B1N1/B1N1)
1916	-1	SW 13 A PHASE (power, A1N1/A1N1)
1917	-1	SW 10 A PHASE (kva, A2N2/A2N2)
1918	-1	SW 10 B PHASE (kva, B2N2/B2N2)
1919	-1	SW 10 B PHASE (kva, C2N2/C2N2)
1920	-1	SW 2 A PHASE (kva, A2N2/A2N2)
1921	-1	SW 2 B PHASE (kva, B2N2/B2N2)
1922	-1	SW 2 C PHASE (kva, C2N2/C2N2)
1923	-1	SW 11 A PHASE (kva, A1N1/A1N1)
1924	-1	SW 11 B PHASE (kva, B1N1/B1N1)
1925	-1	SW 11 C PHASE (kva, C1N1/C1N1)
1926	-1	SW 9 A PHASE (kva, A1N1/A1N1)
1927	-1	SW 9 B PHASE (kva, B1N1/B1N1)
1928	-1	SW 9 C PHASE (kva, C1N1/C1N1)
1929	-1	SW 13 C PHASE (kva, C1N1/C1N1)
1930	-1	SW 13 B PHASE (kva, B1N1/B1N1)
1931	-1	SW 13 A PHASE (kva, A1N1/A1N1)
1932	-1	SW 10 A PHASE (volts, A2N2/A2N2)
1933	-1	SW 10 B PHASE (volts, B2N2/B2N2)
1934	-1	SW 10 B PHASE (volts, C2N2/C2N2)
1935	-1	SW 11 A PHASE (volts, A1N1/A1N1)
1936	-1	SW 11 B PHASE (volts, B1N1/B1N1)
1937	-1	SW 11 C PHASE (volts, C1N1/C1N1)
4830	-1	TOTALIZING CB 1
1902	-1	SW 10 A PHASE (power, A2N2/A2N2)
4831	-1	TOTALIZING CB 3
4833	-1	TOTALIZING CB 4
4832	-1	TOTALIZING CB 2
4904	1	CIRCUIT BKR 3 (power, B1N1/B1N1)
4905	2	CIRCUIT BKR 3 (power, C1N1/C1N1)
4906	3	CIRCUIT BKR 10 (power, A1N1/A1N1)
4907	4	CIRCUIT BKR 10 (power, B1N1/B1N1)
4908	5	CIRCUIT BKR 10 (power, C1N1/C1N1)
4909	6	CIRCUIT BKR 2 (power, A1N1/A1N1)
4910	7	CIRCUIT BKR 2 (power, B1N1/B1N1)
4911	8	CIRCUIT BKR 2 (power, C1N1/C1N1)
4912	9	CIRCUIT BKR 11 (power, A1N1/A1N1)
4913	10	CIRCUIT BKR 11 (power, B1N1/B1N1)

4914	11	CIRCUIT BKR 11 (power, C1N1/C1N1)
4915	12	CIRCUIT BKR 9 (power, A1N1/A1N1)
4916	13	CIRCUIT BKR 9 (power, B1N1/B1N1)
4917	14	CIRCUIT BKR 9 (power, C1N1/C1N1)
4918	15	CIRCUIT BKR 13 (power, A1N1/A1N1)
4919	16	CIRCUIT BKR 13 (power, B1N1/B1N1)
4920	17	CIRCUIT BKR 3 (volts, B1N1/B1N1)
4921	18	CIRCUIT BKR 3 (volts, C1N1/C1N1)
4922	19	CIRCUIT BKR 10 (volts, A1N1/A1N1)
4923	20	CIRCUIT BKR 3 (amps, B1N1/B1N1)
4924	21	CIRCUIT BKR 3 (amps, C1N1/C1N1)
4925	22	CIRCUIT BKR 10 (amps, A1N1/A1N1)
4926	23	CIRCUIT BKR 10 (amps, B1N1/B1N1)
4927	24	CIRCUIT BKR 10 (amps, C1N1/C1N1)
4928	25	CIRCUIT BKR 2 (amps, A1N1/A1N1)
4929	26	CIRCUIT BKR 2 (amps, B1N1/B1N1)
4930	27	CIRCUIT BKR 2 (amps, C1N1/C1N1)
4931	28	CIRCUIT BKR 11 (amps, A1N1/A1N1)
4932	29	CIRCUIT BKR 11 (amps, B1N1/B1N1)
4933	30	CIRCUIT BKR 11 (amps, C1N1/C1N1)
4934	31	CIRCUIT BKR 9 (amps, A1N1/A1N1)
4935	32	CIRCUIT BKR 9 (amps, B1N1/B1N1)
4936	33	CIRCUIT BKR 9 (amps, C1N1/C1N1)
4937	34	CIRCUIT BKR 13 (amps, A1N1/A1N1)
4938	35	CIRCUIT BKR 13 (amps, B1N1/B1N1)

12.1.7. Channel Identification Tables lstaraxp% listchid#948 - 1148 - Central Elect Power Plant (Main Substation #3)

Chid	cp	Description
1939	-1	SW 1 B PHASE (power, B1N1/B1N1)
1940	-1	SW 1 C PHASE (power, C1N1/C1N1)
1941	-1	SW 6 A PHASE (power, A1N1/A1N1)
1942	-1	SW 6 B PHASE (power, B1N1/B1N1)
1943	-1	SW 6 C PHASE (power, C1N1/C1N1)
1944	-1	SW 7 A PHASE (power, A2N1/A2N1)
1945	-1	SW 7 B PHASE (power, B2N1/B2N1)
1946	-1	SW 7 C PHASE (power, C2N1/C2N1)
1947	-1	SW 14 A PHASE (power, A2N1/A2N1)
1948	-1	SW 14 B PHASE (power, B2N1/B2N1)
1949	-1	SW 14 C PHASE (power, C2N1/C2N1)
1950	-1	SW 16 A PHASE (power, A2N1/A2N1)
1951	-1	SW 16 B PHASE (power, B2N1/B2N1)
1952	-1	SW 16 C PHASE (power, C2N1/C2N1)
1953	-1	SW 1 A PHASE (kva, A1N1/A1N1)
1954	-1	SW 1 B PHASE (kva, B1N1/B1N1)
1955	-1	SW 1 C PHASE (kva, C1N1/C1N1)
1956	-1	SW 6 A PHASE (kva, A1N1/A1N1)
1957	-1	SW 6 B PHASE (kva, B1N1/B1N1)
1958	-1	SW 6 C PHASE (kva, C1N1/C1N1)
1959	-1	SW 7 A PHASE (kva, A2N1/A2N1)
1960	-1	SW 7 B PHASE (kva, B2N1/B2N1)
1961	-1	SW 7 C PHASE (kva, C2N1/C2N1)
1962	-1	SW 14 A PHASE (kva, A2N1/A2N1)
1963	-1	SW 14 B PHASE (kva, B2N1/B2N1)
1964	-1	SW 14 C PHASE (kva, C2N1/C2N1)
1965	-1	SW 16 A PHASE (kva, A2N1/A2N1)
1966	-1	SW 16 B PHASE (kva, B2N1/B2N1)
1967	-1	SW 16 C PHASE (kva, C2N1/C2N1)
1968	-1	SW 1 A PHASE (volts, A1N1/A1N1)
1969	-1	SW 1 B PHASE (volts, B1N1/B1N1)
1970	-1	SW 1 C PHASE (volts, C1N1/C1N1)
1971	-1	SW 7 A PHASE (volts, A2N1/A2N1)
1972	-1	SW 7 B PHASE (volts, B2N1/B2N1)
1938	-1	SW 1 A PHASE (power, A1N1/A1N1)
1973	-1	SW 7 C PHASE (volts, C2N1/C2N1)
4949	1	CIRCUIT BKR 13 (power, C1N1/C1N1)
4950	2	CIRCUIT BKR 1 (power, A1N1/A1N1)
4951	3	CIRCUIT BKR 1 (power, B1N1/B1N1)
4952	4	CIRCUIT BKR 1 (power, C1N1/C1N1)
4953	5	CIRCUIT BKR 6 (power, A1N1/A1N1)
4954	6	CIRCUIT BKR 6 (power, B1N1/B1N1)
4955	7	CIRCUIT BKR 6 (power, C1N1/C1N1)
4956	8	CIRCUIT BKR 7 (power, A1N1/A1N1)
4957	9	CIRCUIT BKR 7 (power, B1N1/B1N1)
4958	10	CIRCUIT BKR 7 (power, C1N1/C1N1)
4959	11	CIRCUIT BKR 14 (power, A1N1/A1N1)
4960	12	CIRCUIT BKR 14 (power, B1N1/B1N1)
4961	13	CIRCUIT BKR 14 (power, C1N1/C1N1)
4962	14	CIRCUIT BKR 16 (power, A1N1/A1N1)

4963	15	CIRCUIT BKR 16 (power, B1N1/B1N1)
4964	16	CIRCUIT BKR 16 (power, C1N1/C1N1)
4965	17	CIRCUIT BKR 13 (volts, C1N1/C1N1)
4966	18	CIRCUIT BKR 1 (volts, A1N1/A1N1)
4967	19	CIRCUIT BKR 1 (volts, B1N1/B1N1)
4968	20	CIRCUIT BKR 13 (amps, C1N1/C1N1)
4969	21	CIRCUIT BKR 1 (amps, A1N1/A1N1)
4970	22	CIRCUIT BKR 1 (amps, B1N1/B1N1)
4971	23	CIRCUIT BKR 1 (amps, C1N1/C1N1)
4972	24	CIRCUIT BKR 6 (amps, A1N1/A1N1)
4973	25	CIRCUIT BKR 6 (amps, B1N1/B1N1)
4974	26	CIRCUIT BKR 6 (amps, C1N1/C1N1)
4975	27	CIRCUIT BKR 7 (amps, A1N1/A1N1)
4976	28	CIRCUIT BKR 7 (amps, B1N1/B1N1)
4977	29	CIRCUIT BKR 7 (amps, C1N1/C1N1)
4978	30	CIRCUIT BKR 14 (amps, A1N1/A1N1)
4979	31	CIRCUIT BKR 14 (amps, B1N1/B1N1)
4980	32	CIRCUIT BKR 14 (amps, C1N1/C1N1)
4981	33	CIRCUIT BKR 16 (amps, A1N1/A1N1)
4982	34	CIRCUIT BKR 16 (amps, B1N1/B1N1)
4983	35	CIRCUIT BKR 16 (amps, C1N1/C1N1)

12.1.8. Channel Identification Tables lstaraxp% listchid #949 - 10082 - Ft Hood West Substation

Chid	cp	Description
3305	-1	CLR CRK SW4 C PH (kva, C1N1/C1N1)
3306	-1	CLR CRK SW5 A PH (kva, A1N1/A1N1)
3307	-1	CLR CRK SW5 B PH (kva, B1N1/B1N1)
3308	-1	CLR CRK SW5 C PH (kva, C1N1/C1N1)
3309	-1	CLR CRK SW6 A PH (kva, A1N1/A1N1)
3310	-1	CLR CRK SW6 B PH (kva, B1N1/B1N1)
3311	-1	CLR CRK SW6 C PH (kva, C1N1/C1N1)
3315	-1	TEMP
3303	-1	CLR CRK SW4 A PH (kva, A1N1/A1N1)
3316	-1	SOLAR
3304	-1	CLR CRK SW4 B PH (kva, B1N1/B1N1)
3317	-1	HUMIDITY
3294	1	CLR CRK SW4 A PH (power, A1N1/A1N1)
3295	2	CLR CRK SW4 B PH (power, B1N1/B1N1)
3296	3	CLR CRK SW4 C PH (power, C1N1/C1N1)
3297	4	CLR CRK SW5 A PH (power, A1N1/A1N1)
3298	5	CLR CRK SW5 B PH (power, B1N1/B1N1)
3299	6	CLR CRK SW5 C PH (power, C1N1/C1N1)
3300	7	CLR CRK SW6 A PH (power, A1N1/A1N1)
3301	8	CLR CRK SW6 B PH (power, B1N1/B1N1)
3302	9	CLR CRK SW6 C PH (power, C1N1/C1N1)
4984	10	CLR CRK SW7 A PH (power, A1N1/A1N1)
4985	11	CLR CRK SW7 B PH (power, B1N1/B1N1)
4986	12	CLR CRK SW7 C PH (power, C1N1/C1N1)
4987	13	CLR CRK SW8 A PH (power, A1N1/A1N1)
4988	14	CLR CRK SW8 B PH (power, B1N1/B1N1)
4989	15	CLR CRK SW8 C PH (power, C1N1/C1N1)
3312	16	CLR CRK SW4 A PH (volts, A1N1/A1N1)
3313	17	CLR CRK SW4 B PH (volts, B1N1/B1N1)
3314	18	CLR CRK SW4 C PH (volts, C1N1/C1N1)
4990	19	CLR CRK SW4 A PH (amps, A1N1/A1N1)
4991	20	CLR CRK SW4 B PH (amps, B1N1/B1N1)
4992	21	CLR CRK SW4 C PH (amps, C1N1/C1N1)
4993	22	CLR CRK SW5 A PH (amps, A1N1/A1N1)
4994	23	CLR CRK SW5 B PH (amps, B1N1/B1N1)
4995	24	CLR CRK SW5 C PH (amps, C1N1/C1N1)
4996	25	CLR CRK SW6 A PH (amps, A1N1/A1N1)
4997	26	CLR CRK SW6 B PH (amps, B1N1/B1N1)
4998	27	CLR CRK SW6 C PH (amps, C1N1/C1N1)
4999	28	CLR CRK SW7 A PH (amps, A1N1/A1N1)
5000	29	CLR CRK SW7 B PH (amps, B1N1/B1N1)
5001	30	CLR CRK SW7 C PH (amps, C1N1/C1N1)
5002	31	CLR CRK SW8 A PH (amps, A1N1/A1N1)
5003	32	CLR CRK SW8 B PH (amps, B1N1/B1N1)
5004	33	CLR CRK SW8 C PH (amps, C1N1/C1N1)

12.1.9. Channel Identification Tables lstaraxp% listchid#944 - 1144 10076 Ft Hood - Clear Creek Substation

Chid	cp	Description
4808	-1	CLR CRK SW3 A PH (kva, A1N1/A1N1)
4802	-1	CLR CRK SW1 A PH (kva, A1N1/A1N1)
4803	-1	CLR CRK SW1 B PH (kva, B1N1/B1N1)
4804	-1	CLR CRK SW1 C PH (kva, C1N1/C1N1)
4807	-1	CLR CRK SW2 C PH (kva, C1N1/C1N1)
4805	-1	CLR CRK SW2 A PH (kva, A1N1/A1N1)
4810	-1	CLR CRK SW3 C PH (kva, C1N1/C1N1)
4806	-1	CLR CRK SW2 B PH (kva, B1N1/B1N1)
4809	-1	CLR CRK SW3 B PH (kva, B1N1/B1N1)
4793	1	CLR CRK SW1 A PH (power, A1N1/A1N1)
4794	2	CLR CRK SW1 B PH (power, B1N1/B1N1)
4795	3	CLR CRK SW1 C PH (power, C1N1/C1N1)
4796	4	CLR CRK SW2 A PH (power, A1N1/A1N1)
4797	5	CLR CRK SW2 B PH (power, B1N1/B1N1)
4798	6	CLR CRK SW2 C PH (power, C1N1/C1N1)
4799	7	CLR CRK SW3 A PH (power, A1N1/A1N1)
4800	8	CLR CRK SW3 B PH (power, B1N1/B1N1)
4801	9	CLR CRK SW3 C PH (power, C1N1/C1N1)
4811	10	CLR CRK SW1 A PH (volts, A1N1/A1N1)
4812	11	CLR CRK SW1 B PH (volts, B1N1/B1N1)
4813	12	CLR CRK SW1 C PH (volts, C1N1/C1N1)
5005	13	CLR CRK SW1 A PH (amps, A1N1/A1N1)
5006	14	CLR CRK SW1 B PH (amps, B1N1/B1N1)
5007	15	CLR CRK SW1 C PH (amps, C1N1/C1N1)
5008	16	CLR CRK SW2 A PH (amps, A1N1/A1N1)
5009	17	CLR CRK SW2 B PH (amps, B1N1/B1N1)
5010	18	CLR CRK SW2 C PH (amps, C1N1/C1N1)
5011	19	CLR CRK SW3 A PH (amps, A1N1/A1N1)
5012	20	CLR CRK SW3 B PH (amps, B1N1/B1N1)
5013	21	CLR CRK SW3 C PH (amps, C1N1/C1N1)

12.2. 87000 Block Building Electricity Use From Manual Readings

This appendix contains a summary of the 2001/2002 electricity use for the buildings in the 87000 block of Ft. Hood, including:

87003 BN HQ Building
87004 CO HQ Building
87005 BDE HQ Building
87006 Health Clinic Building
87007 Enlisted UPH Building
87008 BN HQ Building
87009 BN HQ Building
87010 PHYS FIT CTR Building
87011 CO HQ Building
87012 Enlisted UPH Building
87014 CO HQ Building
87015 Enlisted UPH Building
87016 CO HQ Building
87017 Dining Facility
87018 Electricity Use
87018 Natural Gas Use

For each building a table of the electricity use is provided. These readings represent manual readings of the whole-building watthour meters, which are recorded approximately weekly by the Ft. Hood Energy Office. The readings were converted to daily readings by dividing the valued by the number of days between readings. Average temperatures were then calculated for this period of time and are provided in the column next to the daily electricity use.

This table is then followed by a time series graph that shows the kWh/day for each building, and a scatter plot of the daily average data vs the average ambient temperature for that period, which was used to ascertain if there were any temperature dependent loads for each building.

Following this is the baseline analysis for each building. This analysis was preformed using 1, 2, 3 or 4 parameter linear or change-point linear models (ASHRAE 2001; Kissock 1993). For each building the results of the appropriate model are tabulated and a graph is provided that shows also electricity use for the building vs ambient temperature along with a line that represents the model.

In some cases the buildings had significant variations in the electricity use one or more models were chosen to more accurately characterize their use.

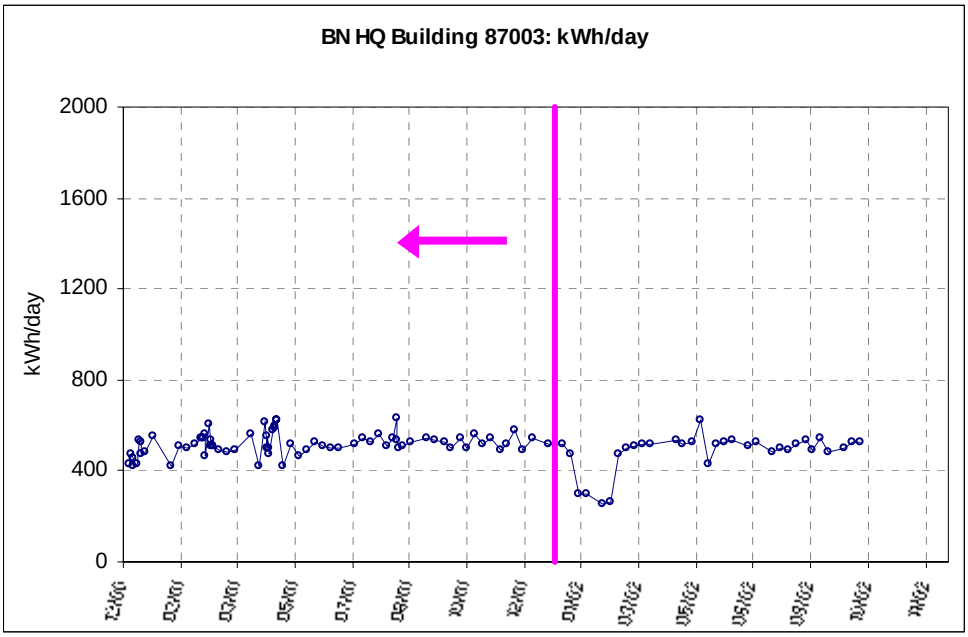
12.2.1. 87003 BN HQ Building

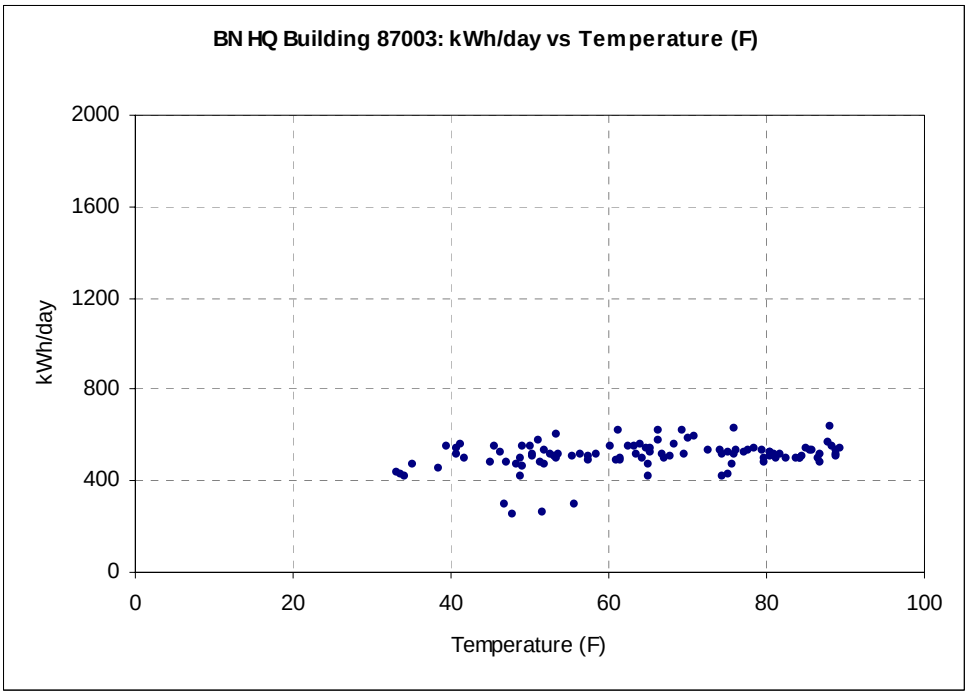
12.2.1.1. Electricity Use From Manual Readings

Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/27/2000	1	13316	13742	426	426	33.7
12/28/2000	1	13742	14215	473	473	35.2
12/29/2000	1	14215	14671	456	456	38.6
1/2/2001	4	14671	16363	1692	423	34.3
1/3/2001	1	16363	16797	434	434	33.1
1/4/2001	1	16797	17335	538	538	40.7
1/5/2001	1	17335	17863	528	528	46.4
1/9/2001	4	17863	19768	1905	476	47.2
1/16/2001	7	19768	23156	3388	484	45.1
1/30/2001	14	23156	30876	7720	551	45.6
2/6/2001	7	30876	33841	2965	424	49.0
2/13/2001	7	33841	37418	3577	511	53.6
2/20/2001	7	37418	40899	3481	497	53.5
2/26/2001	6	40899	43983	3084	514	58.5
2/27/2001	1	43983	44529	546	546	60.2
2/28/2001	1	44529	45075	546	546	50.1
3/1/2001	1	45075	45621	546	546	39.6
3/2/2001	1	45621	46179	558	558	41.3
3/5/2001	3	46179	47571	1392	464	49.0
3/6/2001	1	47571	48173	602	602	53.3
3/7/2001	1	48173	48679	506	506	53.2
3/8/2001	1	48679	49211	532	532	51.8
3/9/2001	1	49211	49719	508	508	50.4
3/13/2001	4	49719	51751	2032	508	55.4
3/20/2001	7	51751	55220	3469	496	48.8
3/27/2001	7	55220	58569	3349	478	51.4
4/10/2001	14	58569	65449	6880	491	61.4
4/17/2001	7	65449	69384	3935	562	68.3
4/23/2001	6	69384	71890	2506	418	65.0
4/24/2001	1	71890	72506	616	616	61.3
4/25/2001	1	72506	73002	496	496	61.4
4/26/2001	1	73002	73554	552	552	63.2
4/27/2001	1	73554	74056	502	502	64.3
4/30/2001	3	74056	75466	1410	470	65.1
5/1/2001	1	75466	76044	578	578	66.4
5/2/2001	1	76044	76628	584	584	70.1
5/3/2001	1	76628	77222	594	594	70.9
5/4/2001	1	77222	77845	623	623	69.3
5/8/2001	4	77845	80341	2496	624	66.4
5/15/2001	7	80341	83281	2940	420	74.4
5/22/2001	7	83281	86911	3630	519	75.9
5/29/2001	7	86911	90188	3277	468	75.6
6/5/2001	7	90188	93647	3459	494	81.2
6/12/2001	7	93647	97346	3699	528	79.6
6/19/2001	7	97346	100927	3581	512	81.7
6/26/2001	7	100927	104409	3482	497	79.7
7/10/2001	14	104409	111378	6969	498	84.4
7/17/2001	7	111378	114998	3620	517	88.9
7/24/2001	7	114998	118809	3811	544	89.4

7/31/2001	7	118809	122518	3709	530	88.8
8/7/2001	7	122518	126470	3952	565	87.8
8/13/2001	6	126470	129517	3047	508	88.9
8/15/2001	2	129517	130611	1094	547	88.4
8/16/2001	1	130611	131245	634	634	88.0
8/17/2001	1	131245	131782	537	537	85.8
8/21/2001	4	131782	133784	2002	501	86.6
8/28/2001	7	133784	137350	3566	509	84.5
9/11/2001	14	137350	144677	7327	523	77.2
9/18/2001	7	144677	148473	3796	542	78.6
9/26/2001	8	148473	152721	4248	531	74.2
10/2/2001	6	152721	155879	3158	526	65.2
10/10/2001	8	155879	159900	4021	503	67.7
10/16/2001	6	159900	163174	3274	546	64.9
10/23/2001	7	163174	166670	3496	499	67.2
10/30/2001	7	166670	170609	3939	563	64.1
11/6/2001	7	170609	174244	3635	519	66.7
11/14/2001	8	174244	178623	4379	547	62.6
11/20/2001	6	178623	181563	2940	490	61.1
11/27/2001	7	181563	185170	3607	515	56.4
12/4/2001	7	185170	189201	4031	576	51.1
12/12/2001	8	189201	193141	3940	493	57.4
12/26/2001	14	193141	200793	7652	547	49.1
1/8/2002	13	200793	207467	6674	513	40.7
1/15/2002	7	207467	211066	3599	514	50.4
1/22/2002	7	211066	214368	3302	472	48.5
1/29/2002	7	214368	216443	2075	296	55.8
2/12/2002	14	216443	220640	4197	300	46.9
2/19/2002	7	220640	222393	1753	250	47.9
2/26/2002	7	222393	224215	1822	260	51.6
3/5/2002	7	224215	227543	3328	475	52.0
3/12/2002	7	227543	231057	3514	502	41.8
3/19/2002	7	231057	234596	3539	506	57.5
3/26/2002	7	234596	238227	3631	519	63.6
4/17/2002	22	238227	249531	11304	514	52.7
4/23/2002	6	249531	252754	3223	537	65.2
4/30/2002	7	252754	256374	3620	517	74.4
5/7/2002	7	256374	260078	3704	529	76.2
5/14/2002	7	260078	264452	4374	625	76.0
5/21/2002	7	264452	267444	2992	427	75.2
5/28/2002	7	267444	271042	3598	514	69.5
6/4/2002	7	271042	274716	3674	525	75.1
6/18/2002	14	274716	282154	7438	531	77.7
6/26/2002	8	282154	286244	4090	511	81.1
7/9/2002	13	286244	293108	6864	528	80.6
7/16/2002	7	293108	296476	3368	481	79.7
7/23/2002	7	296476	299992	3516	502	80.4
7/31/2002	8	299992	303947	3955	494	84.3
8/8/2002	8	303947	308075	4128	516	87.0
8/13/2002	5	308075	310760	2685	537	85.6
8/20/2002	7	310760	314224	3464	495	83.7
8/27/2002	7	314224	318006	3782	540	85.0
9/10/2002	14	318006	324778	6772	484	86.9
9/18/2002	8	324778	328784	4006	501	82.4

9/24/2002	6	328784	331931	3147	525	80.4
10/18/2002	24	331931	344627	12696	529	72.6
1/0/1900	####	344627	0	-344627		71.8





12.2.1.2. Baseline Model From Manual Readings

87003

Path and name of input data file = 8700BLCKbldg.prn
Value of no-data flag = -99
Column number of group field = 20
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable = 1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 15
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

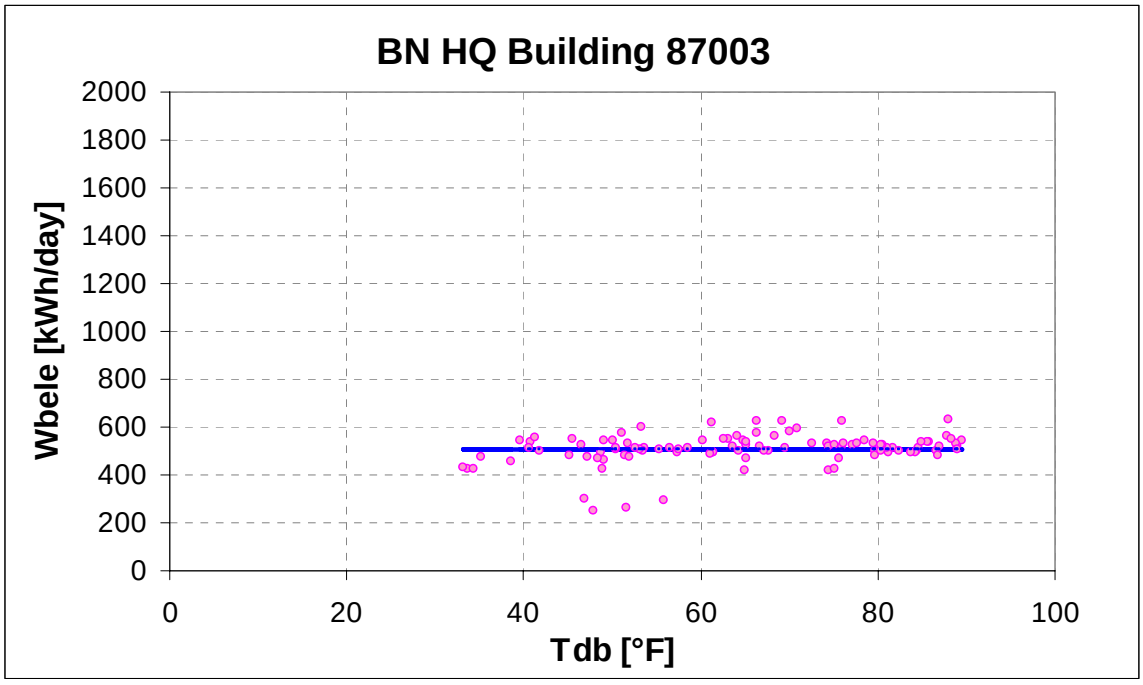
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg.prn
    Model type =           Mean
    Grouping column No =   20
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results

           N =    105

       Ymean =   508.140

      StdDev =    63.585

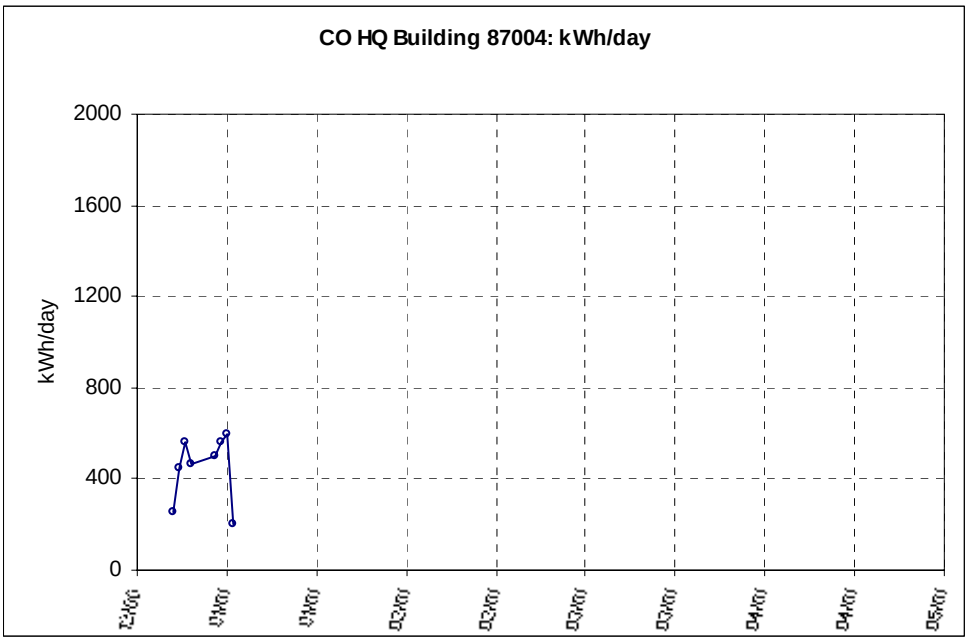
    CV-StDev =    12.513 %
```

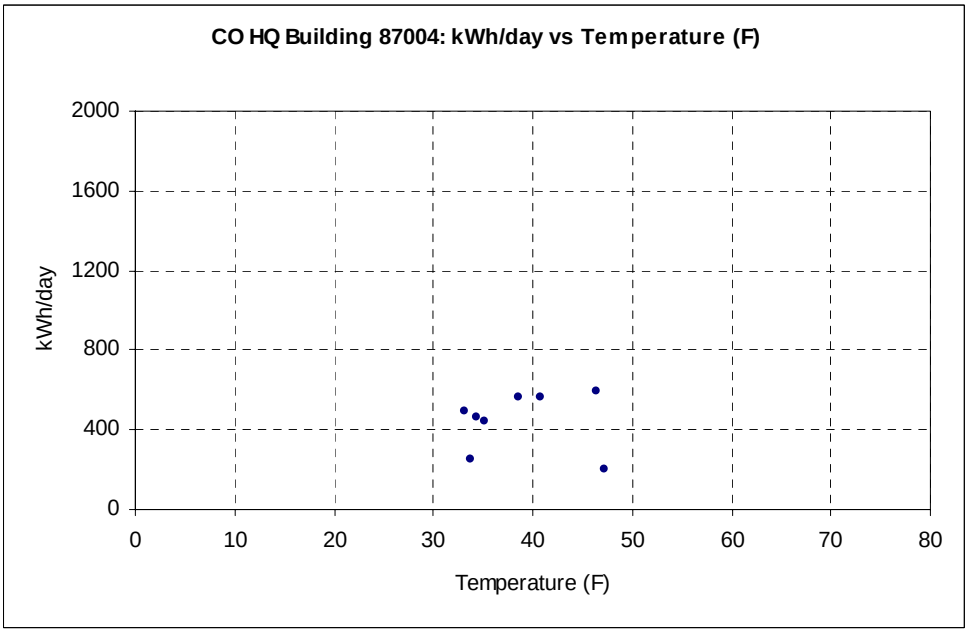

BN HQ Building 87003
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

12.2.2. 87004 CO HQ Building

12.2.2.1. Electricity Use From Manual Readings

87004		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/26/2000	36886	10250	12/26/2000	12/27/2000	1	10250	10503	253	253	33.7
12/27/2000	36887	10503	12/27/2000	12/28/2000	1	10503	10947	444	444	35.2
12/28/2000	36888	10947	12/28/2000	12/29/2000	1	10947	11512	565	565	38.6
12/29/2000	36889	11512	12/29/2000	1/2/2001	4	11512	13358	1846	462	34.3
1/2/2001	36893	13358	1/2/2001	1/3/2001	1	13358	13854	496	496	33.1
1/3/2001	36894	13854	1/3/2001	1/4/2001	1	13854	14415	561	561	40.7
1/4/2001	36895	14415	1/4/2001	1/5/2001	1	14415	15012	597	597	46.4
1/5/2001	36896	15012	1/5/2001	1/9/2001	4	15012	15821	809	202	47.2
1/9/2001	36900	15821	1/9/2001	1/16/2001	7	15821				45.1
1/16/2001	36907		1/16/2001	1/30/2001	14					45.6
1/30/2001	36921		1/30/2001	2/6/2001	7					49.0
2/6/2001	36928		2/6/2001	2/13/2001	7					53.6
2/13/2001	36935		2/13/2001	2/20/2001	7					53.5
2/20/2001	36942		2/20/2001	2/26/2001	6					58.5
2/26/2001	36948		2/26/2001	2/27/2001	1					60.2
2/27/2001	36949		2/27/2001	2/28/2001	1					50.1
2/28/2001	36950		2/28/2001	3/1/2001	1					39.6
3/1/2001	36951		3/1/2001	3/2/2001	1					41.3
3/2/2001	36952		3/2/2001	3/5/2001	3					49.0
3/5/2001	36955		3/5/2001	3/6/2001	1					53.3
3/6/2001	36956		3/6/2001	3/7/2001	1					53.2
3/7/2001	36957		3/7/2001	3/8/2001	1					51.8
3/8/2001	36958		3/8/2001	3/9/2001	1					50.4
3/9/2001	36959		3/9/2001	3/13/2001	4					55.4
3/13/2001	36963		3/13/2001	3/20/2001	7					48.8
3/20/2001	36970		3/20/2001	3/27/2001	7					51.4
3/27/2001	36977		3/27/2001	4/10/2001	14					61.4
4/10/2001	36991		4/10/2001	4/17/2001	7					68.3
4/17/2001	36998		4/17/2001	4/23/2001	6					65.0
4/23/2001	37004		4/23/2001	4/24/2001	1					61.3
4/24/2001	37005		4/24/2001	4/25/2001	1					61.4
4/25/2001	37006		4/25/2001	4/26/2001	1					63.2
4/26/2001	37007		4/26/2001	4/27/2001	1					64.3
4/27/2001	37008		4/27/2001	4/30/2001	3					65.1
4/30/2001	37011		4/30/2001	5/1/2001	1					66.4
5/1/2001	37012		5/1/2001	5/2/2001	1					70.1
5/2/2001	37013		5/2/2001	5/3/2001	1					70.9
5/3/2001	37014		5/3/2001	5/4/2001	1					69.3
5/4/2001	37015		5/4/2001	5/8/2001	4					66.4
5/8/2001	37019		5/8/2001							


CO HQ Building 87004: kWh/day
kWh/day
2000
1600
1200
800
400
0


CO HQ Building 87004: kWh/day vs Temperature (F)
kWh/day
2000
1600
1200
800
400
0
0
10
20
30
40
50
60
70
80
Temperature (F)

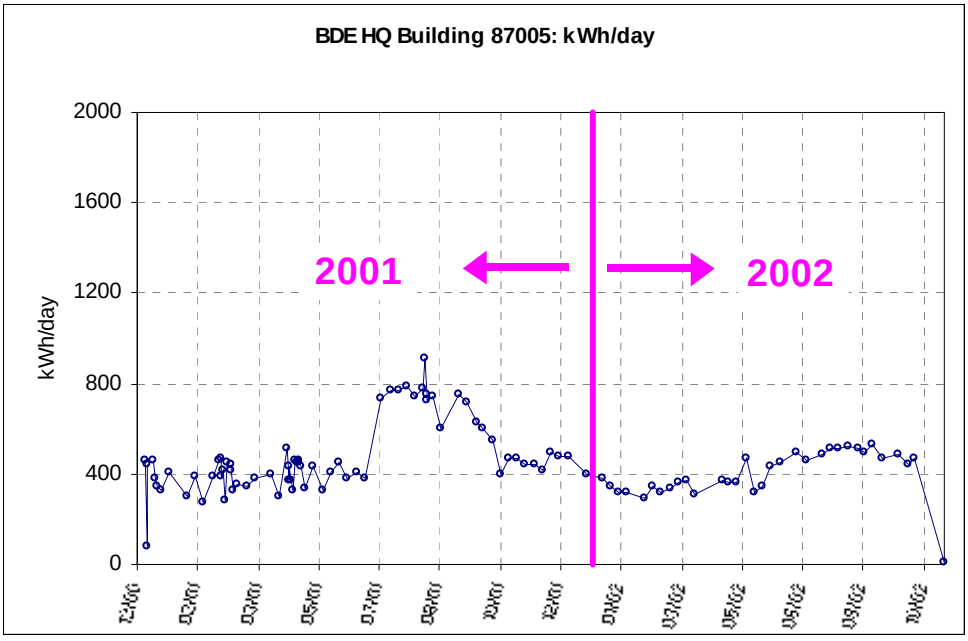
12.2.3. 87005 BDE HQ Building

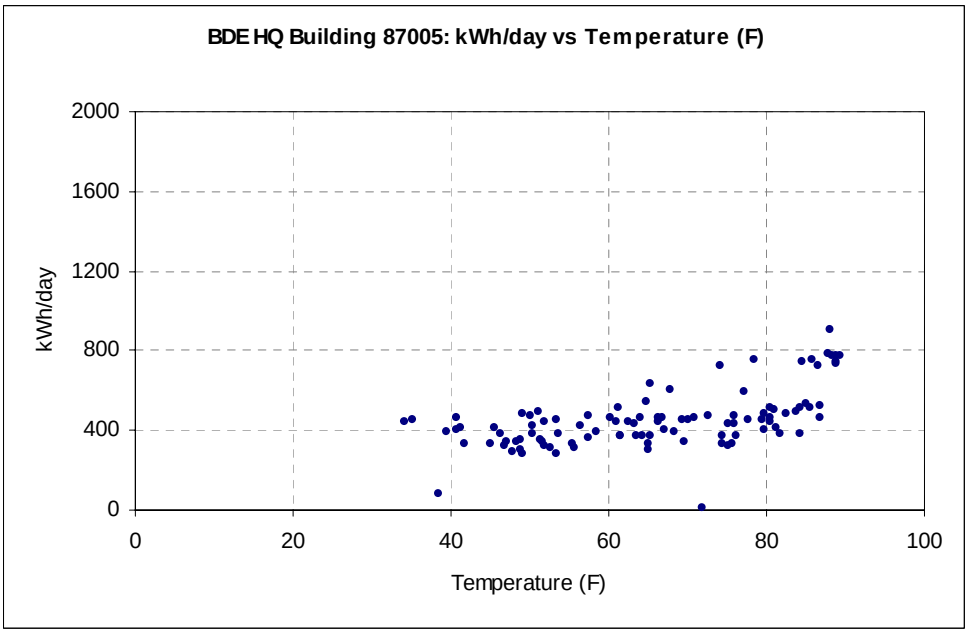
12.2.3.1. Electricity Use From Manual Readings

87005		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/26/2000	36886		12/26/2000	12/27/2000	1					33.7
12/27/2000	36887	9660	12/27/2000	12/28/2000	1	9660	10117	457	457	35.2
12/28/2000	36888	10117	12/28/2000	12/29/2000	1	10117	10195	78	78	38.6
12/29/2000	36889	10195	12/29/2000	1/2/2001	4	10195	11981	1786	447	34.3
1/2/2001	36893									33.1
1/3/2001	36894	11981	1/3/2001	1/4/2001	1	11981	12440	459	459	40.7
1/4/2001	36895	12440	1/4/2001	1/5/2001	1	12440	12818	378	378	46.4
1/5/2001	36896	12818	1/5/2001	1/9/2001	4	12818	14189	1371	343	47.2
1/9/2001	36900	14189	1/9/2001	1/16/2001	7	14189	16511	2322	332	45.1
1/16/2001	36907	16511	1/16/2001	1/30/2001	14	16511	22268	5757	411	45.6
1/30/2001	36921	22268	1/30/2001	2/6/2001	7	22268	24372	2104	301	49.0
2/6/2001	36928	24372	2/6/2001	2/13/2001	7	24372	27079	2707	387	53.6
2/13/2001	36935	27079	2/13/2001	2/20/2001	7	27079	29025	1946	278	53.5
2/20/2001	36942	29025	2/20/2001	2/26/2001	6	29025	31351	2326	388	58.5
2/26/2001	36948	31351	2/26/2001	2/27/2001	1	31351	31809	458	458	60.2
2/27/2001	36949	31809	2/27/2001	2/28/2001	1	31809	32281	472	472	50.1
2/28/2001	36950	32281	2/28/2001	3/1/2001	1	32281	32674	393	393	39.6
3/1/2001	36951	32674	3/1/2001	3/2/2001	1	32674	33086	412	412	41.3
3/2/2001	36952	33086	3/2/2001	3/5/2001	3	33086	33936	850	283	49.0
3/5/2001	36955	33936	3/5/2001	3/7/2001	2	33936	34839	903	452	53.3
3/6/2001	36956									53.2
3/7/2001	36957	34779	3/7/2001	3/8/2001	1	34779	35224	445	445	51.8
3/8/2001	36958	35224	3/8/2001	3/9/2001	1	35224	35644	420	420	50.4
3/9/2001	36959	35644	3/9/2001	3/13/2001	4	35644	36961	1317	329	55.4
3/13/2001	36963	36961	3/13/2001	3/20/2001	7	36961	39429	2468	353	48.8
3/20/2001	36970	39429	3/20/2001	3/27/2001	7	39429	41860	2431	347	51.4
3/27/2001	36977	41860	3/27/2001	4/10/2001	14	41860	47129	5269	376	61.4
4/10/2001	36991	47129	4/10/2001	4/17/2001	7	47129	49899	2770	396	68.3
4/17/2001	36998	49899	4/17/2001	4/23/2001	6	49899	51693	1794	299	65.0
4/23/2001	37004	51693	4/23/2001	4/24/2001	1	51693	52204	511	511	61.3
4/24/2001	37005	52204	4/24/2001	4/25/2001	1	52204	52580	376	376	61.4
4/25/2001	37006	52580	4/25/2001	4/26/2001	1	52580	53014	434	434	63.2
4/26/2001	37007	53014	4/26/2001	4/27/2001	1	53014	53387	373	373	64.3
4/27/2001	37008	53387	4/27/2001	4/30/2001	3	53387	54381	994	331	65.1
4/30/2001	37011	54381	4/30/2001	5/1/2001	1	54381	54842	461	461	66.4
5/1/2001	37012	54842	5/1/2001	5/2/2001	1	54842	55294	452	452	70.1
5/2/2001	37013	55294	5/2/2001	5/3/2001	1	55294	55758	464	464	70.9
5/3/2001	37014	55758	5/3/2001	5/4/2001	1	55758	56213	455	455	69.3
5/4/2001	37015	56213	5/4/2001	5/8/2001	4	56213	57965	1752	438	66.4
5/8/2001	37019	57965	5/8/2001	5/15/2001	7	57965	60296	2331	333	74.4
5/15/2001	37026	60296	5/15/2001	5/22/2001	7	60296	63315	3019	431	75.9
5/22/2001	37033	63315	5/22/2001	5/29/2001	7	63315	65637	2322	332	75.6
5/29/2001	37040	65637	5/29/2001	6/5/2001	7	65637	68488	2851	407	81.2
6/5/2001	37047	68488	6/5/2001	6/12/2001	7	68488	71646	3158	451	79.6
6/12/2001	37054	71646	6/12/2001	6/19/2001	7	71646	74338	2692	385	81.7
6/19/2001	37061	74338	6/19/2001	6/26/2001	7	74338	77172	2834	405	79.7
6/26/2001	37068	77172	6/26/2001	7/10/2001	14	77172	82522	5350	382	84.4

7/10/2001	37082	82522	7/10/2001	7/17/2001	7	82522	87682	5160	737	88.9
7/17/2001	37089	87682	7/17/2001	7/24/2001	7	87682	93065	5383	769	89.4
7/24/2001	37096	93065	7/24/2001	7/31/2001	7	93065	98458	5393	770	88.8
7/31/2001	37103	98458	7/31/2001	8/7/2001	7	98458	103970	5512	787	87.8
8/7/2001	37110	103970	8/7/2001	8/13/2001	6	103970	108405	4435	739	88.9
8/13/2001	37116	108405	8/13/2001	8/15/2001	2	108405	109956	1551	776	88.4
8/15/2001	37118	109956	8/15/2001	8/16/2001	1	109956	110864	908	908	88.0
8/16/2001	37119	110864	8/16/2001	8/17/2001	1	110864	111617	753	753	85.8
8/17/2001	37120	111617	8/17/2001	8/21/2001	4	111617	114530	2913	728	86.6
8/21/2001	37124	114530	8/21/2001	8/28/2001	7	114530	119753	5223	746	84.5
8/28/2001	37131	119753	8/28/2001	9/11/2001	14	119753	128124	8371	598	77.2
9/11/2001	37145	128124	9/11/2001	9/18/2001	7	128124	133367	5243	749	78.6
9/18/2001	37152	133367	9/18/2001	9/26/2001	8	133367	139124	5757	720	74.2
9/26/2001	37160	139124	9/26/2001	10/2/2001	6	139124	142893	3769	628	65.2
10/2/2001	37166	142893	10/2/2001	10/10/2001	8	142893	147705	4812	602	67.7
10/10/2001	37174	147705	10/10/2001	10/16/2001	6	147705	150986	3281	547	64.9
10/16/2001	37180	150986	10/16/2001	10/23/2001	7	150986	153773	2787	398	67.2
10/23/2001	37187	153773	10/23/2001	10/30/2001	7	153773	157032	3259	466	64.1
10/30/2001	37194	157032	10/30/2001	11/6/2001	7	157032	160288	3256	465	66.7
11/6/2001	37201	160288	11/6/2001	11/14/2001	8	160288	163860	3572	447	62.6
11/14/2001	37209	163860	11/14/2001	11/20/2001	6	163860	166501	2641	440	61.1
11/20/2001	37215	166501	11/20/2001	11/27/2001	7	166501	169438	2937	420	56.4
11/27/2001	37222	169438	11/27/2001	12/4/2001	7	169438	172882	3444	492	51.1
12/4/2001	37229	172882	12/4/2001	12/12/2001	8	172882	176678	3796	475	57.4
12/12/2001	37237	176678	12/12/2001	12/26/2001	14	176678	183367	6689	478	49.1
12/26/2001	37251	183367	12/26/2001	1/8/2002	13	183367	188580	5213	401	40.7
1/8/2002	37264	188580	1/8/2002	1/15/2002	7	188580	191259	2679	383	50.4
1/15/2002	37271	191259	1/15/2002	1/22/2002	7	191259	193669	2410	344	48.5
1/22/2002	37278	193669	1/22/2002	1/29/2002	7	193669	195878	2209	316	55.8
1/29/2002	37285	195878	1/29/2002	2/12/2002	14	195878	200362	4484	320	46.9
2/12/2002	37299	200362	2/12/2002	2/19/2002	7	200362	202432	2070	296	47.9
2/19/2002	37306	202432	2/19/2002	2/26/2002	7	202432	204845	2413	345	51.6
2/26/2002	37313	204845	2/26/2002	3/5/2002	7	204845	207078	2233	319	52.0
3/5/2002	37320	207078	3/5/2002	3/12/2002	7	207078	209402	2324	332	41.8
3/12/2002	37327	209402	3/12/2002	3/19/2002	7	209402	211934	2532	362	57.5
3/19/2002	37334	211934	3/19/2002	3/26/2002	7	211934	214530	2596	371	63.6
3/26/2002	37341	214530	3/26/2002	4/17/2002	22	214530	221418	6888	313	52.7
4/17/2002	37363	221418	4/17/2002	4/23/2002	6	221418	223652	2234	372	65.2
4/23/2002	37369	223652	4/23/2002	4/30/2002	7	223652	226221	2569	367	74.4
4/30/2002	37376	226221	4/30/2002	5/7/2002	7	226221	228790	2569	367	76.2
5/7/2002	37383	228790	5/7/2002	5/14/2002	7	228790	232097	3307	472	76.0
5/14/2002	37390	232097	5/14/2002	5/21/2002	7	232097	234350	2253	322	75.2
5/21/2002	37397	234350	5/21/2002	5/28/2002	7	234350	236748	2398	343	69.5
5/28/2002	37404	236748	5/28/2002	6/4/2002	7	236748	239807	3059	437	75.1
6/4/2002	37411	239807	6/4/2002	6/18/2002	14	239807	246093	6286	449	77.7
6/18/2002	37425	246093	6/18/2002	6/26/2002	8	246093	250087	3994	499	81.1
6/26/2002	37433	250087	6/26/2002	7/9/2002	13	250087	256100	6013	463	80.6
7/9/2002	37446	256100	7/9/2002	7/16/2002	7	256100	259483	3383	483	79.7
7/16/2002	37453	259483	7/16/2002	7/23/2002	7	259483	263082	3599	514	80.4
7/23/2002	37460	263082	7/23/2002	7/31/2002	8	263082	267215	4133	517	84.3
7/31/2002	37468	267215	7/31/2002	8/8/2002	8	267215	271408	4193	524	87.0
8/8/2002	37476	271408	8/8/2002	8/13/2002	5	271408	273962	2554	511	85.6
8/13/2002	37481	273962	8/13/2002	8/20/2002	7	273962	277411	3449	493	83.7
8/20/2002	37488	277411	8/20/2002	8/27/2002	7	277411	281112	3701	529	85.0

8/27/2002	37495	281112	8/27/2002	9/10/2002	14	281112	287628	6516	465	86.9
9/10/2002	37509	287628	9/10/2002	9/18/2002	8	287628	291513	3885	486	82.4
9/18/2002	37517	291513	9/18/2002	9/24/2002	6	291513	294142	2629	438	80.4
9/24/2002	37523	294142	9/24/2002	10/18/2002	24	294142	305492	11350	473	72.6
10/18/2002	37547	305492	10/18/2002	1/0/1900	-37547	305492	0	-305492	8	71.8





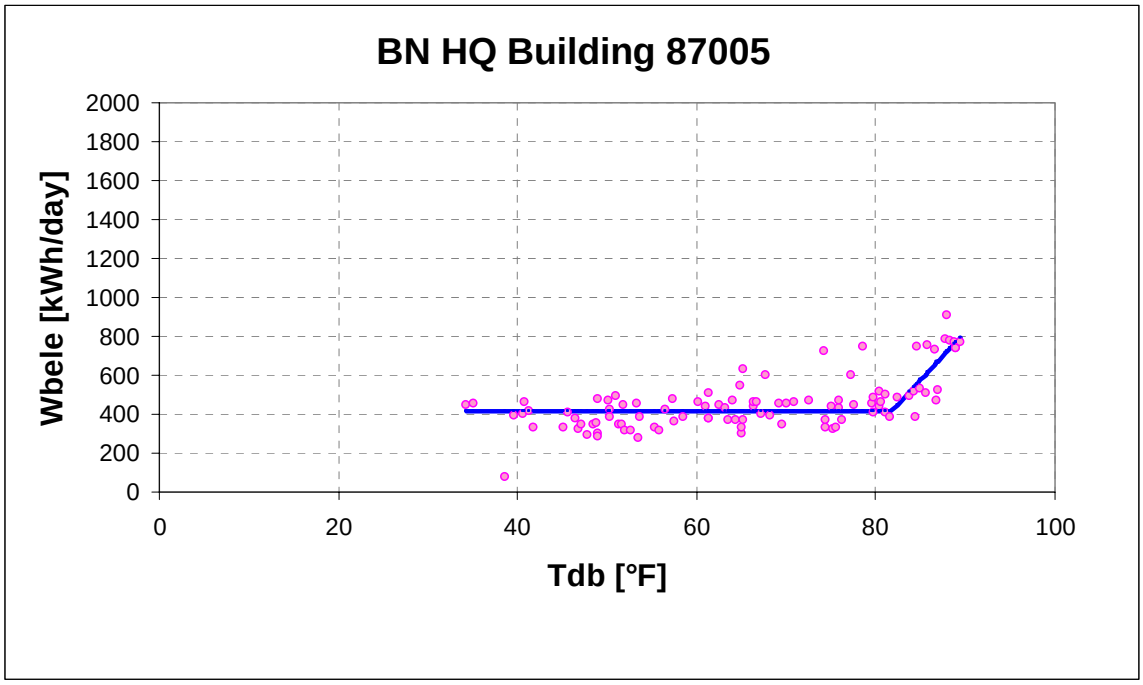
12.2.3.2. Baseline Model From Manual Readings

87005

Path and name of input data file = 8700BLCKbldg2.prn
Value of no-data flag = -99
Column number of group field = 12
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable = 3
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 11
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg2.prn
    Model type =           3P Cooling
    Grouping column No =   12
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      3
    X1 column number =  11
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results

          N =    102
         R2 =     0.507
      AdjR2 =     0.507
       RMSE =     97.8534
     CV-RMSE =    21.523%
          p =     0.524
         DW =     0.949 (p>0)
         N1 =     84
         N2 =     18
        Ycp =    413.4942 (     10.5040)
         LS =      0.0000 (      0.0000)
         RS =     49.0181 (      4.8317)
        Xcp =     81.7104 (      1.1028)
```


BN HQ Building 87005
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

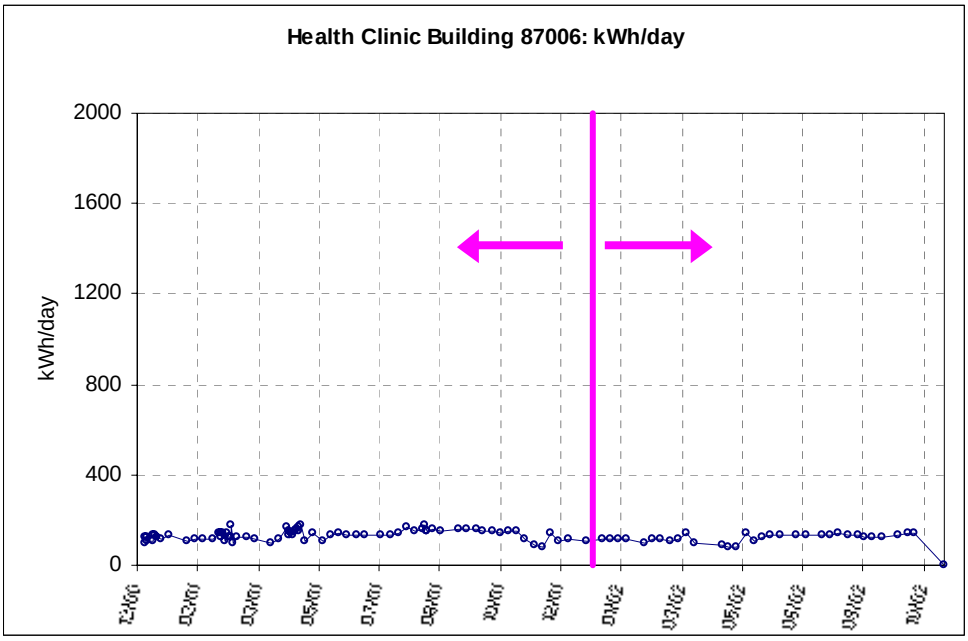
12.2.4. 87006 Health Clinic Building

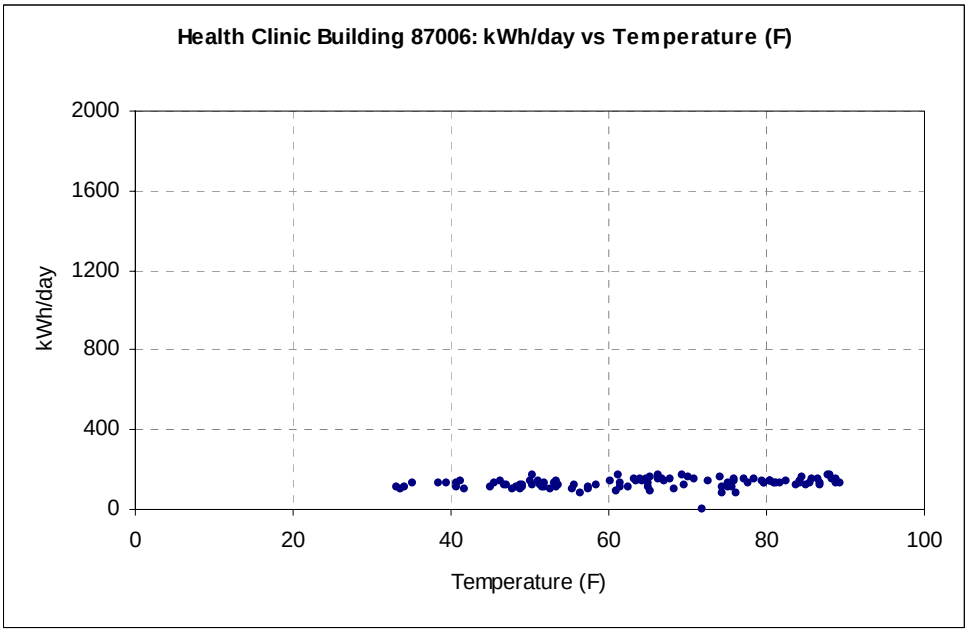
12.2.4.1. Electricity Use From Manual Readings

	Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
36886	3482	12/26/2000	12/27/2000	1	3482	3578	96	96	33.7
36887	3578	12/27/2000	12/28/2000	1	3578	3705	127	127	35.2
36888	3705	12/28/2000	12/29/2000	1	3705	3832	127	127	38.6
36889	3832	12/29/2000	1/2/2001	4	3832	4262	430	108	34.3
36893	4262	1/2/2001	1/3/2001	1	4262	4370	108	108	33.1
36894	4370	1/3/2001	1/4/2001	1	4370	4504	134	134	40.7
36895	4504	1/4/2001	1/5/2001	1	4504	4640	136	136	46.4
36896	4640	1/5/2001	1/9/2001	4	4640	5128	488	122	47.2
36900	5128	1/9/2001	1/16/2001	7	5128	5912	784	112	45.1
36907	5912	1/16/2001	1/30/2001	14	5912	7760	1848	132	45.6
36921	7760	1/30/2001	2/6/2001	7	7760	8481	721	103	49.0
36928	8481	2/6/2001	2/13/2001	7	8481	9310	829	118	53.6
36935	9310	2/13/2001	2/20/2001	7	9310	10102	792	113	53.5
36942	10102	2/20/2001	2/26/2001	6	10102	10818	716	119	58.5
36948	10818	2/26/2001	2/27/2001	1	10818	10957	139	139	60.2
36949	10957	2/27/2001	2/28/2001	1	10957	11099	142	142	50.1
36950	11099	2/28/2001	3/1/2001	1	11099	11225	126	126	39.6
36951	11225	3/1/2001	3/2/2001	1	11225	11368	143	143	41.3
36952	11368	3/2/2001	3/5/2001	3	11368	11688	320	107	49.0
36955	11688	3/5/2001	3/6/2001	1	11688	11832	144	144	53.3
36956	11832	3/6/2001	3/7/2001	1	11832	11958	126	126	53.2
36957	11958	3/7/2001	3/8/2001	1	11958	12084	126	126	51.8
36958	12084	3/8/2001	3/9/2001	1	12084	12257	173	173	50.4
36959	12257	3/9/2001	3/13/2001	4	12257	12655	398	100	55.4
36963	12655	3/13/2001	3/20/2001	7	12655	13504	849	121	48.8
36970	13504	3/20/2001	3/27/2001	7	13504	14371	867	124	51.4
36977	14371	3/27/2001	4/10/2001	14	14371	15940	1569	112	61.4
36991	15940	4/10/2001	4/17/2001	7	15940	16652	712	102	68.3
36998	16652	4/17/2001	4/23/2001	6	16652	17320	668	111	65.0
37004	17320	4/23/2001	4/24/2001	1	17320	17487	167	167	61.3
37005	17487	4/24/2001	4/25/2001	1	17487	17619	132	132	61.4
37006	17619	4/25/2001	4/26/2001	1	17619	17772	153	153	63.2
37007	17772	4/26/2001	4/27/2001	1	17772	17910	138	138	64.3
37008	17910	4/27/2001	4/30/2001	3	17910	18306	396	132	65.1
37011	18306	4/30/2001	5/1/2001	1	18306	18457	151	151	66.4
37012	18457	5/1/2001	5/2/2001	1	18457	18613	156	156	70.1
37013	18613	5/2/2001	5/3/2001	1	18613	18760	147	147	70.9
37014	18760	5/3/2001	5/4/2001	1	18760	18932	172	172	69.3
37015	18932	5/4/2001	5/8/2001	4	18932	19632	700	175	66.4
37019	19632	5/8/2001	5/15/2001	7	19632	20392	760	109	74.4
37026	20392	5/15/2001	5/22/2001	7	20392	21410	1018	145	75.9
37033	21410	5/22/2001	5/29/2001	7	21410	22172	762	109	75.6
37040	22172	5/29/2001	6/5/2001	7	22172	23079	907	130	81.2
37047	23079	6/5/2001	6/12/2001	7	23079	24074	995	142	79.6
37054	24074	6/12/2001	6/19/2001	7	24074	24998	924	132	81.7
37061	24998	6/19/2001	6/26/2001	7	24998	25945	947	135	79.7
37068	25945	6/26/2001	7/10/2001	14	25945	27791	1846	132	84.4
37082	27791	7/10/2001	7/17/2001	7	27791	28706	915	131	88.9

37089	28706	7/17/2001	7/24/2001	7	28706	29646	940	134	89.4
37096	29646	7/24/2001	7/31/2001	7	29646	30662	1016	145	88.8
37103	30662	7/31/2001	8/7/2001	7	30662	31824	1162	166	87.8
37110	31824	8/7/2001	8/13/2001	6	31824	32703	879	147	88.9
37116	32703	8/13/2001	8/15/2001	2	32703	33014	311	156	88.4
37118	33014	8/15/2001	8/16/2001	1	33014	33188	174	174	88.0
37119	33188	8/16/2001	8/17/2001	1	33188	33337	149	149	85.8
37120	33337	8/17/2001	8/21/2001	4	33337	33927	590	148	86.6
37124	33927	8/21/2001	8/28/2001	7	33927	35020	1093	156	84.5
37131	35020	8/28/2001	9/11/2001	14	35020	37146	2126	152	77.2
37145	37146	9/11/2001	9/18/2001	7	37146	38234	1088	155	78.6
37152	38234	9/18/2001	9/26/2001	8	38234	39497	1263	158	74.2
37160	39497	9/26/2001	10/2/2001	6	39497	40443	946	158	65.2
37166	40443	10/2/2001	10/10/2001	8	40443	41612	1169	146	67.7
37174	41612	10/10/2001	10/16/2001	6	41612	42490	878	146	64.9
37180	42490	10/16/2001	10/23/2001	7	42490	43495	1005	144	67.2
37187	43495	10/23/2001	10/30/2001	7	43495	44578	1083	155	64.1
37194	44578	10/30/2001	11/6/2001	7	44578	45654	1076	154	66.7
37201	45654	11/6/2001	11/14/2001	8	45654	46577	923	115	62.6
37209	46577	11/14/2001	11/20/2001	6	46577	47118	541	90	61.1
37215	47118	11/20/2001	11/27/2001	7	47118	47706	588	84	56.4
37222	47706	11/27/2001	12/4/2001	7	47706	48711	1005	144	51.1
37229	48711	12/4/2001	12/12/2001	8	48711	49539	828	104	57.4
37237	49539	12/12/2001	12/26/2001	14	49539	51174	1635	117	49.1
37251	51174	12/26/2001	1/8/2002	13	51174	52588	1414	109	40.7
37264	52588	1/8/2002	1/15/2002	7	52588	53400	812	116	50.4
37271	53400	1/15/2002	1/22/2002	7	53400	54180	780	111	48.5
37278	54180	1/22/2002	1/29/2002	7	54180	54997	817	117	55.8
37285	54997	1/29/2002	2/12/2002	14	54997	56618	1621	116	46.9
37299	56618	2/12/2002	2/19/2002	7	56618	57318	700	100	47.9
37306	57318	2/19/2002	2/26/2002	7	57318	58121	803	115	51.6
37313	58121	2/26/2002	3/5/2002	7	58121	58916	795	114	52.0
37320	58916	3/5/2002	3/12/2002	7	58916	59638	722	103	41.8
37327	59638	3/12/2002	3/19/2002	7	59638	60445	807	115	57.5
37334	60445	3/19/2002	3/26/2002	7	60445	61430	985	141	63.6
37341	61430	3/26/2002	4/17/2002	22	61430	63591	2161	98	52.7
37363	63591	4/17/2002	4/23/2002	6	63591	64108	517	86	65.2
37369	64108	4/23/2002	4/30/2002	7	64108	64637	529	76	74.4
37376	64637	4/30/2002	5/7/2002	7	64637	65177	540	77	76.2
37383	65177	5/7/2002	5/14/2002	7	65177	66199	1022	146	76.0
37390	66199	5/14/2002	5/21/2002	7	66199	66958	759	108	75.2
37397	66958	5/21/2002	5/28/2002	7	66958	67801	843	120	69.5
37404	67801	5/28/2002	6/4/2002	7	67801	68708	907	130	75.1
37411	68708	6/4/2002	6/18/2002	14	68708	70570	1862	133	77.7
37425	70570	6/18/2002	6/26/2002	8	70570	71604	1034	129	81.1
37433	71604	6/26/2002	7/9/2002	13	71604	73386	1782	137	80.6
37446	73386	7/9/2002	7/16/2002	7	73386	74286	900	129	79.7
37453	74286	7/16/2002	7/23/2002	7	74286	75239	953	136	80.4
37460	75239	7/23/2002	7/31/2002	8	75239	76361	1122	140	84.3
37468	76361	7/31/2002	8/8/2002	8	76361	77416	1055	132	87.0
37476	77416	8/8/2002	8/13/2002	5	77416	78060	644	129	85.6
37481	78060	8/13/2002	8/20/2002	7	78060	78933	873	125	83.7
37488	78933	8/20/2002	8/27/2002	7	78933	79787	854	122	85.0
37495	79787	8/27/2002	9/10/2002	14	79787	81526	1739	124	86.9

37509	81526	9/10/2002	9/18/2002	8	81526	82622	1096	137	82.4
37517	82622	9/18/2002	9/24/2002	6	82622	83447	825	138	80.4
37523	83447	9/24/2002	10/18/2002	24	83447	86915	3468	145	72.6
37547	86915	10/18/2002	1/0/1900	####	86915	0	-86915	2	71.8



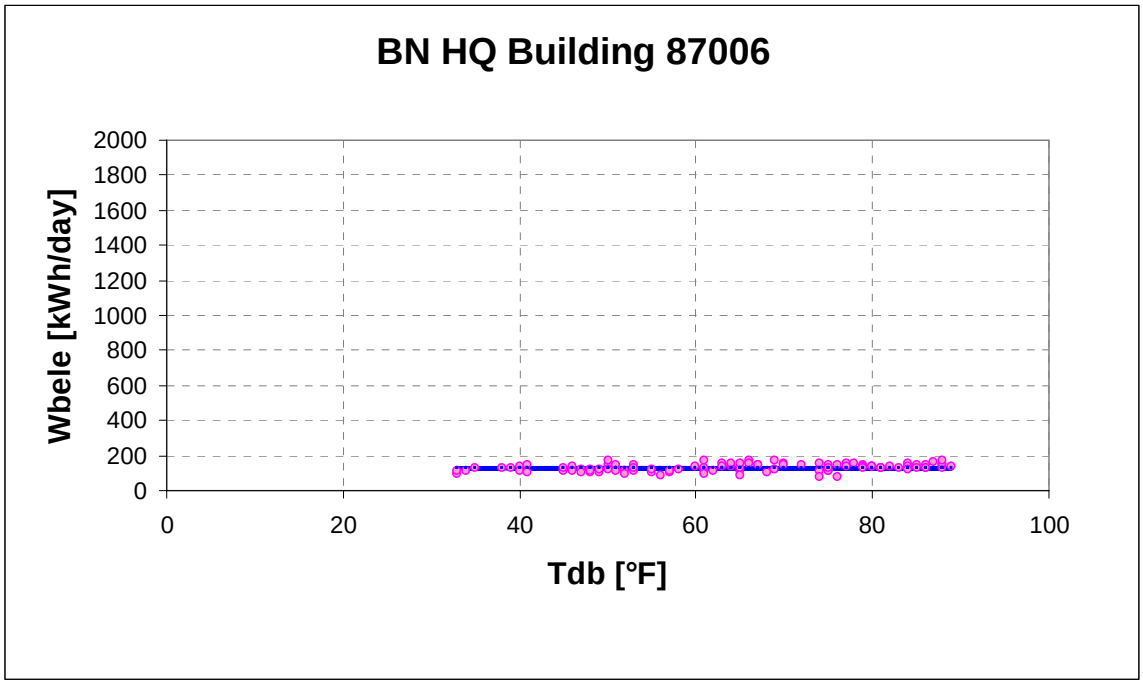


12.2.4.2. Baseline Model From Manual Readings

87006

Path and name of input data file = 8700BLCKbldg2.prn
Value of no-data flag = -99
Column number of group field = 12
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable = 4
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 11
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg2_.prn
    Model type =           Mean
    Grouping column No =   12
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      4
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    105
       Ymean =   129.386
      StdDev =    21.287
    CV-StDev =    16.452 %
```


BN HQ Building 87006
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

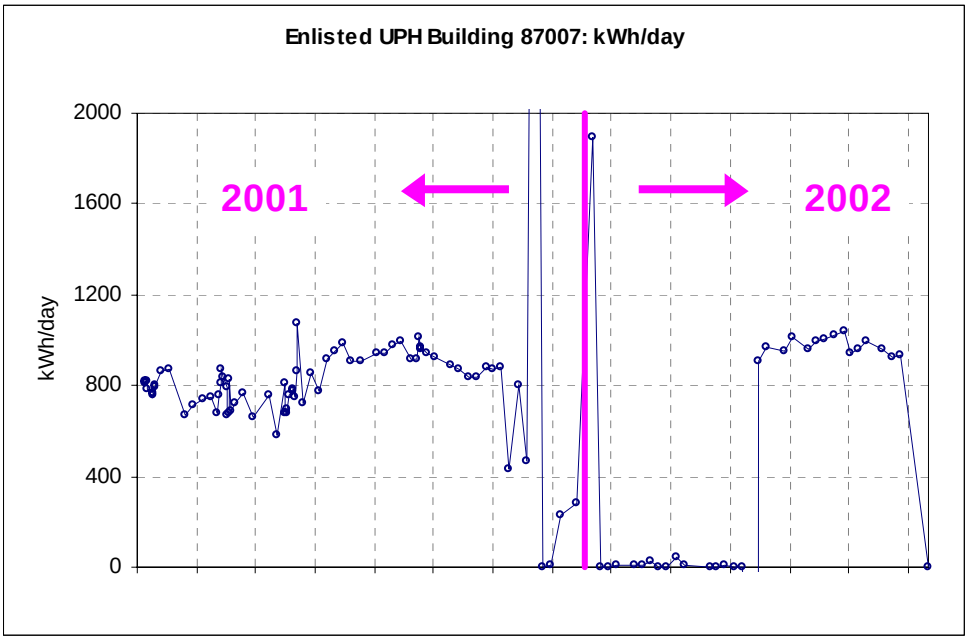
12.2.5. 87007 Enlisted UPH Building

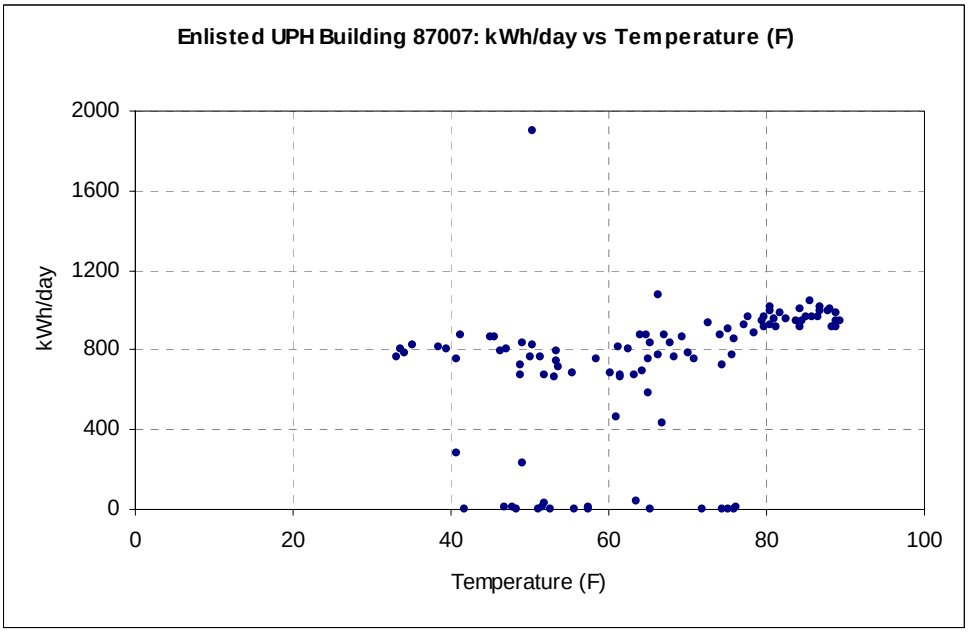
12.2.5.1. Electricity Use From Manual Readings

	Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
36886	22746	12/26/2000	12/27/2000	1	22746	23555	809	809	33.7
36887	23555	12/27/2000	12/28/2000	1	23555	24376	821	821	35.2
36888	24376	12/28/2000	12/29/2000	1	24376	25193	817	817	38.6
36889	25193	12/29/2000	1/2/2001	4	25193	28313	3120	780	34.3
36893	28313	1/2/2001	1/3/2001	1	28313	29080	767	767	33.1
36894	29080	1/3/2001	1/4/2001	1	29080	29837	757	757	40.7
36895	29837	1/4/2001	1/5/2001	1	29837	30629	792	792	46.4
36896	30629	1/5/2001	1/9/2001	4	30629	33848	3219	805	47.2
36900	33848	1/9/2001	1/16/2001	7	33848	39903	6055	865	45.1
36907	39903	1/16/2001	1/30/2001	14	39903	52054	12151	868	45.6
36921	52054	1/30/2001	2/6/2001	7	52054	56750	4696	671	49.0
36928	56750	2/6/2001	2/13/2001	7	56750	61744	4994	713	53.6
36935	61744	2/13/2001	2/20/2001	7	61744	66955	5211	744	53.5
36942	66955	2/20/2001	2/26/2001	6	66955	71452	4497	750	58.5
36948	71452	2/26/2001	2/27/2001	1	71452	72134	682	682	60.2
36949	72134	2/27/2001	2/28/2001	1	72134	72893	759	759	50.1
36950	72893	2/28/2001	3/1/2001	1	72893	73700	807	807	39.6
36951	73700	3/1/2001	3/2/2001	1	73700	74574	874	874	41.3
36952	74574	3/2/2001	3/5/2001	3	74574	77090	2516	839	49.0
36955	77090	3/5/2001	3/6/2001	1	77090	77885	795	795	53.3
36956	77885	3/6/2001	3/7/2001	1	77885	78552	667	667	53.2
36957	78552	3/7/2001	3/8/2001	1	78552	79229	677	677	51.8
36958	79229	3/8/2001	3/9/2001	1	79229	80058	829	829	50.4
36959	80058	3/9/2001	3/13/2001	4	80058	82807	2749	687	55.4
36963	82807	3/13/2001	3/20/2001	7	82807	87849	5042	720	48.8
36970	87849	3/20/2001	3/27/2001	7	87849	93198	5349	764	51.4
36977	93198	3/27/2001	4/10/2001	14	93198	102451	9253	661	61.4
36991	102451	4/10/2001	4/17/2001	7	102451	107777	5326	761	68.3
36998	107777	4/17/2001	4/23/2001	6	107777	111284	3507	585	65.0
37004	111284	4/23/2001	4/24/2001	1	111284	112094	810	810	61.3
37005	112094	4/24/2001	4/25/2001	1	112094	112770	676	676	61.4
37006	112770	4/25/2001	4/26/2001	1	112770	113448	678	678	63.2
37007	113448	4/26/2001	4/27/2001	1	113448	114143	695	695	64.3
37008	114143	4/27/2001	4/30/2001	3	114143	116414	2271	757	65.1
37011	116414	4/30/2001	5/1/2001	1	116414	117190	776	776	66.4
37012	117190	5/1/2001	5/2/2001	1	117190	117970	780	780	70.1
37013	117970	5/2/2001	5/3/2001	1	117970	118722	752	752	70.9
37014	118722	5/3/2001	5/4/2001	1	118722	119583	861	861	69.3
37015	119583	5/4/2001	5/8/2001	4	119583	123868	4285	1071	66.4
37019	123868	5/8/2001	5/15/2001	7	123868	128906	5038	720	74.4
37026	128906	5/15/2001	5/22/2001	7	128906	134904	5998	857	75.9
37033	134904	5/22/2001	5/29/2001	7	134904	140346	5442	777	75.6
37040	140346	5/29/2001	6/5/2001	7	140346	146757	6411	916	81.2
37047	146757	6/5/2001	6/12/2001	7	146757	153405	6648	950	79.6
37054	153405	6/12/2001	6/19/2001	7	153405	160294	6889	984	81.7
37061	160294	6/19/2001	6/26/2001	7	160294	166664	6370	910	79.7
37068	166664	6/26/2001	7/10/2001	14	166664	179427	12763	912	84.4
37082	179427	7/10/2001	7/17/2001	7	179427	186029	6602	943	88.9

37089	186029	7/17/2001	7/24/2001	7	186029	192614	6585	941	89.4
37096	192614	7/24/2001	7/31/2001	7	192614	199484	6870	981	88.8
37103	199484	7/31/2001	8/7/2001	7	199484	206430	6946	992	87.8
37110	206430	8/7/2001	8/13/2001	6	206430	211925	5495	916	88.9
37116	211925	8/13/2001	8/15/2001	2	211925	213762	1837	919	88.4
37118	213762	8/15/2001	8/16/2001	1	213762	214772	1010	1010	88.0
37119	214772	8/16/2001	8/17/2001	1	214772	215735	963	963	85.8
37120	215735	8/17/2001	8/21/2001	4	215735	219597	3862	966	86.6
37124	219597	8/21/2001	8/28/2001	7	219597	226191	6594	942	84.5
37131	226191	8/28/2001	9/11/2001	14	226191	239096	12905	922	77.2
37145	239096	9/11/2001	9/18/2001	7	239096	245306	6210	887	78.6
37152	245306	9/18/2001	9/26/2001	8	245306	252290	6984	873	74.2
37160	252290	9/26/2001	10/2/2001	6	252290	257316	5026	838	65.2
37166	257316	10/2/2001	10/10/2001	8	257316	263998	6682	835	67.7
37174	263998	10/10/2001	10/16/2001	6	263998	269271	5273	879	64.9
37180	269271	10/16/2001	10/23/2001	7	269271	275372	6101	872	67.2
37187	275372	10/23/2001	10/30/2001	7	275372	281526	6154	879	64.1
37194	281526	10/30/2001	11/6/2001	7	281526	284570	3044	435	66.7
37201	284570	11/6/2001	11/14/2001	8	284570	291010	6440	805	62.6
37209	291010	11/14/2001	11/20/2001	6	291010	293790	2780	463	61.1
37215	293790	11/20/2001	11/27/2001	7	293790	336281	42491	6070	56.4
37222	336281	11/27/2001	12/4/2001	7	336281	336281	0	0	51.1
37229	336281	12/4/2001	12/12/2001	8	336281	336342	61	8	57.4
37237	336342	12/12/2001	12/26/2001	14	336342	339541	3199	229	49.1
37251	339541	12/26/2001	1/8/2002	13	339541	343261	3720	286	40.7
37264	343261	1/8/2002	1/15/2002	7	343261	356538	13277	1897	50.4
37271	356538	1/15/2002	1/22/2002	7	356538	356538	0	0	48.5
37278	356538	1/22/2002	1/29/2002	7	356538	356539	1	0	55.8
37285	356539	1/29/2002	2/12/2002	14	356539	356697	158	11	46.9
37299	356697	2/12/2002	2/19/2002	7	356697	356743	46	7	47.9
37306	356743	2/19/2002	2/26/2002	7	356743	356786	43	6	51.6
37313	356786	2/26/2002	3/5/2002	7	356786	356964	178	25	52.0
37320	356964	3/5/2002	3/12/2002	7	356964	356964	0	0	41.8
37327	356964	3/12/2002	3/19/2002	7	356964	356970	6	1	57.5
37334	356970	3/19/2002	3/26/2002	7	356970	357266	296	42	63.6
37341	357266	3/26/2002	4/17/2002	22	357266	357366	100	5	52.7
37363	357366	4/17/2002	4/23/2002	6	357366	357343	-23	-4	65.2
37369	357343	4/23/2002	4/30/2002	7	357343	357346	3	0	74.4
37376	357346	4/30/2002	5/7/2002	7	357346	357407	61	9	76.2
37383	357407	5/7/2002	5/14/2002	7	357407	357416	9	1	76.0
37390	357416	5/14/2002	5/21/2002	7	357416	357416	0	0	75.2
37397	357416	5/21/2002	5/28/2002	7	357416	5238	-352178	-50311	69.5
37404	5238	5/28/2002	6/4/2002	7	5238	11589	6351	907	75.1
37411	11589	6/4/2002	6/18/2002	14	11589	25110	13521	966	77.7
37425	25110	6/18/2002	6/26/2002	8	25110	32746	7636	955	81.1
37433	32746	6/26/2002	7/9/2002	13	32746	45930	13184	1014	80.6
37446	45930	7/9/2002	7/16/2002	7	45930	52658	6728	961	79.7
37453	52658	7/16/2002	7/23/2002	7	52658	59616	6958	994	80.4
37460	59616	7/23/2002	7/31/2002	8	59616	67633	8017	1002	84.3
37468	67633	7/31/2002	8/8/2002	8	67633	75775	8142	1018	87.0
37476	75775	8/8/2002	8/13/2002	5	75775	80995	5220	1044	85.6
37481	80995	8/13/2002	8/20/2002	7	80995	87620	6625	946	83.7
37488	87620	8/20/2002	8/27/2002	7	87620	94359	6739	963	85.0
37495	94359	8/27/2002	9/10/2002	14	94359	108272	13913	994	86.9

37509	108272	9/10/2002	9/18/2002	8	108272	115944	7672	959	82.4
37517	115944	9/18/2002	9/24/2002	6	115944	121491	5547	925	80.4
37523	121491	9/24/2002	10/18/2002	24	121491	143990	22499	937	72.6
37547	143990	10/18/2002	1/0/1900	####	143990	0	-143990	4	71.8



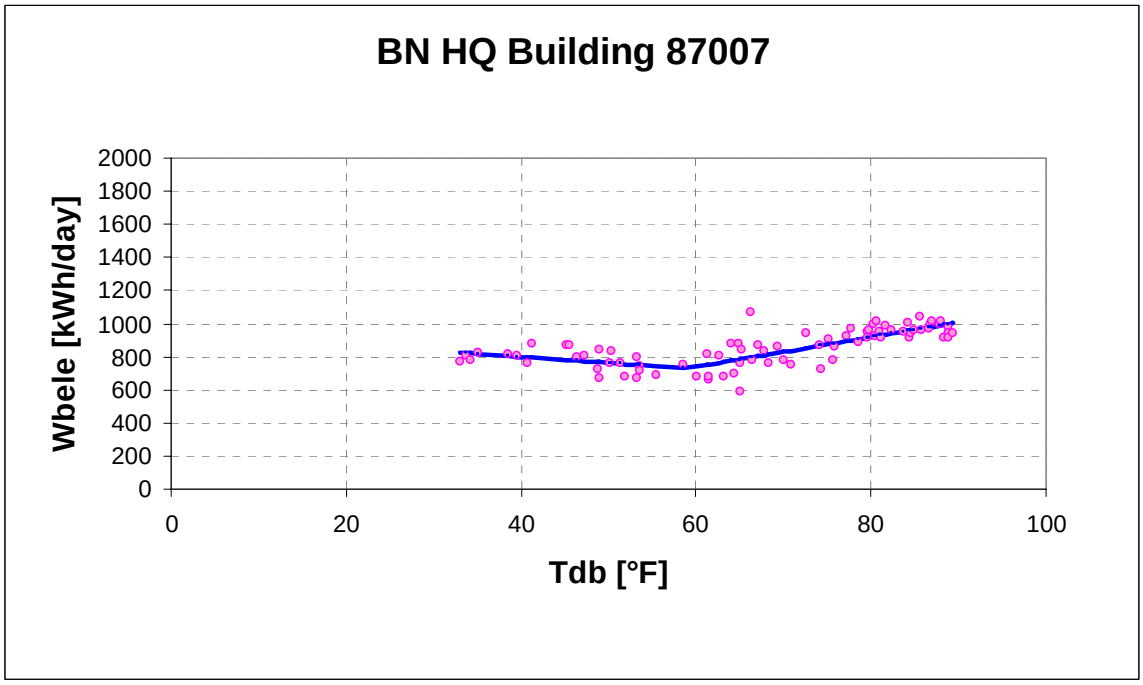


12.2.5.2. Baseline Model From Manual Readings

87007

Path and name of input data file = 8700BLCKbldg2_.prn
Value of no-data flag = -99
Column number of group field = 12
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 5
Column number of dependent Y variable = 5
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 11
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg2_.prn
    Model type =           4P
    Grouping column No =   12
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      5
    X1 column number =  11
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     81
          R2 =     0.625
       AdjR2 =     0.625
        RMSE =     68.5684
     CV-RMSE =     8.062%
           p =     0.178
          DW =     1.624 (p>0)
          N1 =     25
          N2 =     56
         Ycp =    728.5020 (    104.3004)
          LS =     -3.7204 (      1.3328)
          RS =      9.0576 (      2.3762)
         Xcp =     59.0280 (      1.1260)
```


BN HQ Building 87007
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

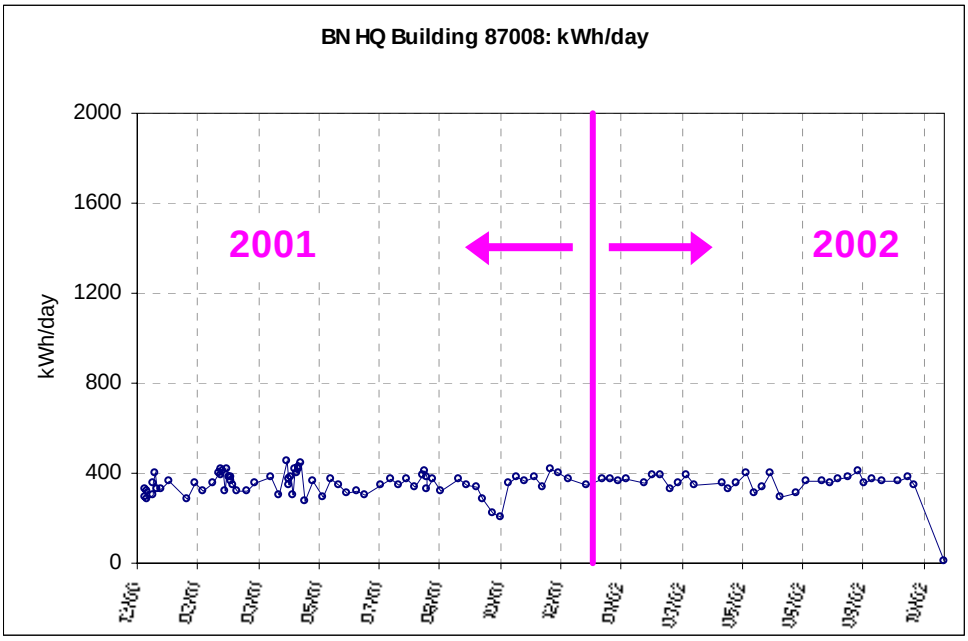
12.2.6. 87008 BN HQ Building

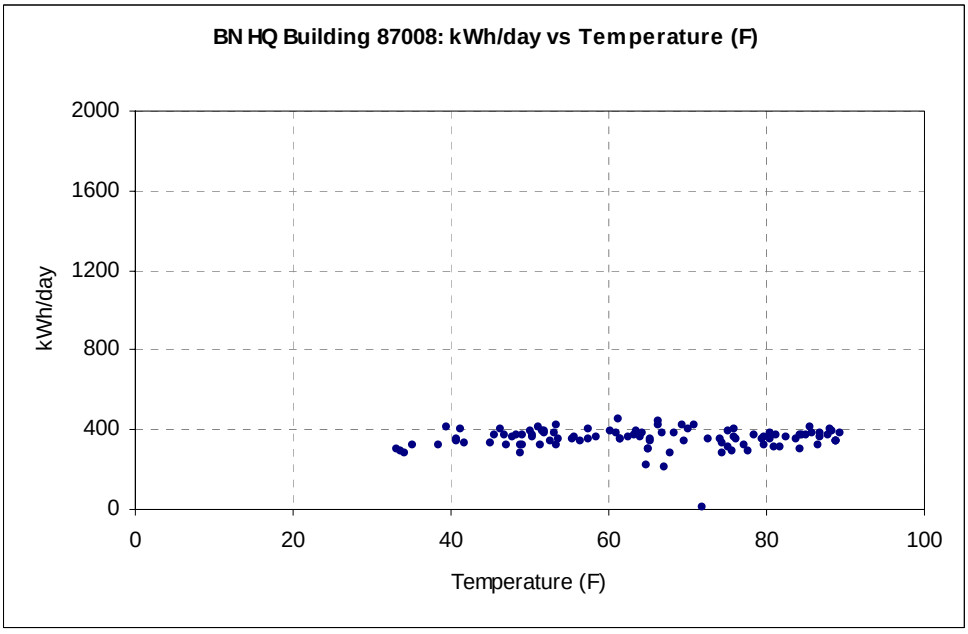
12.2.6.1. Electricity Use From Manual Readings

87008		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/26/2000	36886	8286	12/26/2000	12/27/2000	1	8286	8580	294	294	33.7
12/27/2000	36887	8580	12/27/2000	12/28/2000	1	8580	8905	325	325	35.2
12/28/2000	36888	8905	12/28/2000	12/29/2000	1	8905	9225	320	320	38.6
12/29/2000	36889	9225	12/29/2000	1/2/2001	4	9225	10360	1135	284	34.3
1/2/2001	36893	10360	1/2/2001	1/3/2001	1	10360	10663	303	303	33.1
1/3/2001	36894	10663	1/3/2001	1/4/2001	1	10663	11019	356	356	40.7
1/4/2001	36895	11019	1/4/2001	1/5/2001	1	11019	11420	401	401	46.4
1/5/2001	36896	11420	1/5/2001	1/9/2001	4	11420	12724	1304	326	47.2
1/9/2001	36900	12724	1/9/2001	1/16/2001	7	12724	15033	2309	330	45.1
1/16/2001	36907	15033	1/16/2001	1/30/2001	14	15033	20171	5138	367	45.6
1/30/2001	36921	20171	1/30/2001	2/6/2001	7	20171	22160	1989	284	49.0
2/6/2001	36928	22160	2/6/2001	2/13/2001	7	22160	24639	2479	354	53.6
2/13/2001	36935	24639	2/13/2001	2/20/2001	7	24639	26884	2245	321	53.5
2/20/2001	36942	26884	2/20/2001	2/26/2001	6	26884	29031	2147	358	58.5
2/26/2001	36948	29031	2/26/2001	2/27/2001	1	29031	29427	396	396	60.2
2/27/2001	36949	29427	2/27/2001	2/28/2001	1	29427	29819	392	392	50.1
2/28/2001	36950	29819	2/28/2001	3/1/2001	1	29819	30236	417	417	39.6
3/1/2001	36951	30236	3/1/2001	3/2/2001	1	30236	30641	405	405	41.3
3/2/2001	36952	30641	3/2/2001	3/5/2001	3	30641	31598	957	319	49.0
3/5/2001	36955	31598	3/5/2001	3/6/2001	1	31598	32017	419	419	53.3
3/6/2001	36956	32017	3/6/2001	3/7/2001	1	32017	32397	380	380	53.2
3/7/2001	36957	32397	3/7/2001	3/8/2001	1	32397	32775	378	378	51.8
3/8/2001	36958	32775	3/8/2001	3/9/2001	1	32775	33141	366	366	50.4
3/9/2001	36959	33141	3/9/2001	3/13/2001	4	33141	34540	1399	350	55.4
3/13/2001	36963	34540	3/13/2001	3/20/2001	7	34540	36762	2222	317	48.8
3/20/2001	36970	36762	3/20/2001	3/27/2001	7	36762	39015	2253	322	51.4
3/27/2001	36977	39015	3/27/2001	4/10/2001	14	39015	43942	4927	352	61.4
4/10/2001	36991	43942	4/10/2001	4/17/2001	7	43942	46593	2651	379	68.3
4/17/2001	36998	46593	4/17/2001	4/23/2001	6	46593	48411	1818	303	65.0
4/23/2001	37004	48411	4/23/2001	4/24/2001	1	48411	48863	452	452	61.3
4/24/2001	37005	48863	4/24/2001	4/25/2001	1	48863	49212	349	349	61.4
4/25/2001	37006	49212	4/25/2001	4/26/2001	1	49212	49585	373	373	63.2
4/26/2001	37007	49585	4/26/2001	4/27/2001	1	49585	49969	384	384	64.3
4/27/2001	37008	49969	4/27/2001	4/30/2001	3	49969	50869	900	300	65.1
4/30/2001	37011	50869	4/30/2001	5/1/2001	1	50869	51289	420	420	66.4
5/1/2001	37012	51289	5/1/2001	5/2/2001	1	51289	51690	401	401	70.1
5/2/2001	37013	51690	5/2/2001	5/3/2001	1	51690	52112	422	422	70.9
5/3/2001	37014	52112	5/3/2001	5/4/2001	1	52112	52535	423	423	69.3
5/4/2001	37015	52535	5/4/2001	5/8/2001	4	52535	54304	1769	442	66.4
5/8/2001	37019	54304	5/8/2001	5/15/2001	7	54304	56252	1948	278	74.4
5/15/2001	37026	56252	5/15/2001	5/22/2001	7	56252	58778	2526	361	75.9
5/22/2001	37033	58778	5/22/2001	5/29/2001	7	58778	60828	2050	293	75.6
5/29/2001	37040	60828	5/29/2001	6/5/2001	7	60828	63457	2629	376	81.2
6/5/2001	37047	63457	6/5/2001	6/12/2001	7	63457	65913	2456	351	79.6
6/12/2001	37054	65913	6/12/2001	6/19/2001	7	65913	68088	2175	311	81.7
6/19/2001	37061	68088	6/19/2001	6/26/2001	7	68088	70345	2257	322	79.7
6/26/2001	37068	70345	6/26/2001	7/10/2001	14	70345	74526	4181	299	84.4

7/10/2001	37082	74526	7/10/2001	7/17/2001	7	74526	76949	2423	346	88.9
7/17/2001	37089	76949	7/17/2001	7/24/2001	7	76949	79590	2641	377	89.4
7/24/2001	37096	79590	7/24/2001	7/31/2001	7	79590	82005	2415	345	88.8
7/31/2001	37103	82005	7/31/2001	8/7/2001	7	82005	84589	2584	369	87.8
8/7/2001	37110	84589	8/7/2001	8/13/2001	6	84589	86640	2051	342	88.9
8/13/2001	37116	86640	8/13/2001	8/15/2001	2	86640	87419	779	390	88.4
8/15/2001	37118	87419	8/15/2001	8/16/2001	1	87419	87824	405	405	88.0
8/16/2001	37119	87824	8/16/2001	8/17/2001	1	87824	88202	378	378	85.8
8/17/2001	37120	88202	8/17/2001	8/21/2001	4	88202	89502	1300	325	86.6
8/21/2001	37124	89502	8/21/2001	8/28/2001	7	89502	92124	2622	375	84.5
8/28/2001	37131	92124	8/28/2001	9/11/2001	14	92124	96603	4479	320	77.2
9/11/2001	37145	96603	9/11/2001	9/18/2001	7	96603	99235	2632	376	78.6
9/18/2001	37152	99235	9/18/2001	9/26/2001	8	99235	102024	2789	349	74.2
9/26/2001	37160	102024	9/26/2001	10/2/2001	6	102024	104055	2031	339	65.2
10/2/2001	37166	104055	10/2/2001	10/10/2001	8	104055	106337	2282	285	67.7
10/10/2001	37174	106337	10/10/2001	10/16/2001	6	106337	107690	1353	226	64.9
10/16/2001	37180	107690	10/16/2001	10/23/2001	7	107690	109151	1461	209	67.2
10/23/2001	37187	109151	10/23/2001	10/30/2001	7	109151	111652	2501	357	64.1
10/30/2001	37194	111652	10/30/2001	11/6/2001	7	111652	114319	2667	381	66.7
11/6/2001	37201	114319	11/6/2001	11/14/2001	8	114319	117249	2930	366	62.6
11/14/2001	37209	117249	11/14/2001	11/20/2001	6	117249	119535	2286	381	61.1
11/20/2001	37215	119535	11/20/2001	11/27/2001	7	119535	121896	2361	337	56.4
11/27/2001	37222	121896	11/27/2001	12/4/2001	7	121896	124797	2901	414	51.1
12/4/2001	37229	124797	12/4/2001	12/12/2001	8	124797	128014	3217	402	57.4
12/12/2001	37237	128014	12/12/2001	12/26/2001	14	128014	133226	5212	372	49.1
12/26/2001	37251	133226	12/26/2001	1/8/2002	13	133226	137730	4504	346	40.7
1/8/2002	37264	137730	1/8/2002	1/15/2002	7	137730	140339	2609	373	50.4
1/15/2002	37271	140339	1/15/2002	1/22/2002	7	140339	142965	2626	375	48.5
1/22/2002	37278	142965	1/22/2002	1/29/2002	7	142965	145488	2523	360	55.8
1/29/2002	37285	145488	1/29/2002	2/12/2002	14	145488	150667	5179	370	46.9
2/12/2002	37299	150667	2/12/2002	2/19/2002	7	150667	153171	2504	358	47.9
2/19/2002	37306	153171	2/19/2002	2/26/2002	7	153171	155889	2718	388	51.6
2/26/2002	37313	155889	2/26/2002	3/5/2002	7	155889	158648	2759	394	52.0
3/5/2002	37320	158648	3/5/2002	3/12/2002	7	158648	160964	2316	331	41.8
3/12/2002	37327	160964	3/12/2002	3/19/2002	7	160964	163432	2468	353	57.5
3/19/2002	37334	163432	3/19/2002	3/26/2002	7	163432	166148	2716	388	63.6
3/26/2002	37341	166148	3/26/2002	4/17/2002	22	166148	173720	7572	344	52.7
4/17/2002	37363	173720	4/17/2002	4/23/2002	6	173720	175830	2110	352	65.2
4/23/2002	37369	175830	4/23/2002	4/30/2002	7	175830	178139	2309	330	74.4
4/30/2002	37376	178139	4/30/2002	5/7/2002	7	178139	180608	2469	353	76.2
5/7/2002	37383	180608	5/7/2002	5/14/2002	7	180608	183436	2828	404	76.0
5/14/2002	37390	183436	5/14/2002	5/21/2002	7	183436	185624	2188	313	75.2
5/21/2002	37397	185624	5/21/2002	5/28/2002	7	185624	188018	2394	342	69.5
5/28/2002	37404	188018	5/28/2002	6/4/2002	7	188018	190787	2769	396	75.1
6/4/2002	37411	190787	6/4/2002	6/18/2002	14	190787	194915	4128	295	77.7
6/18/2002	37425	194915	6/18/2002	6/26/2002	8	194915	197411	2496	312	81.1
6/26/2002	37433	197411	6/26/2002	7/9/2002	13	197411	202133	4722	363	80.6
7/9/2002	37446	202133	7/9/2002	7/16/2002	7	202133	204682	2549	364	79.7
7/16/2002	37453	204682	7/16/2002	7/23/2002	7	204682	207166	2484	355	80.4
7/23/2002	37460	207166	7/23/2002	7/31/2002	8	207166	210130	2964	371	84.3
7/31/2002	37468	210130	7/31/2002	8/8/2002	8	210130	213184	3054	382	87.0
8/8/2002	37476	213184	8/8/2002	8/13/2002	5	213184	215238	2054	411	85.6
8/13/2002	37481	215238	8/13/2002	8/20/2002	7	215238	217701	2463	352	83.7
8/20/2002	37488	217701	8/20/2002	8/27/2002	7	217701	220317	2616	374	85.0

8/27/2002	37495	220317	8/27/2002	9/10/2002	14	220317	225367	5050	361	86.9
9/10/2002	37509	225367	9/10/2002	9/18/2002	8	225367	228298	2931	366	82.4
9/18/2002	37517	228298	9/18/2002	9/24/2002	6	228298	230590	2292	382	80.4
9/24/2002	37523	230590	9/24/2002	10/18/2002	24	230590	239015	8425	351	72.6
10/18/2002	37547	239015	10/18/2002	1/0/1900	####	239015	0	-239015	6	71.8



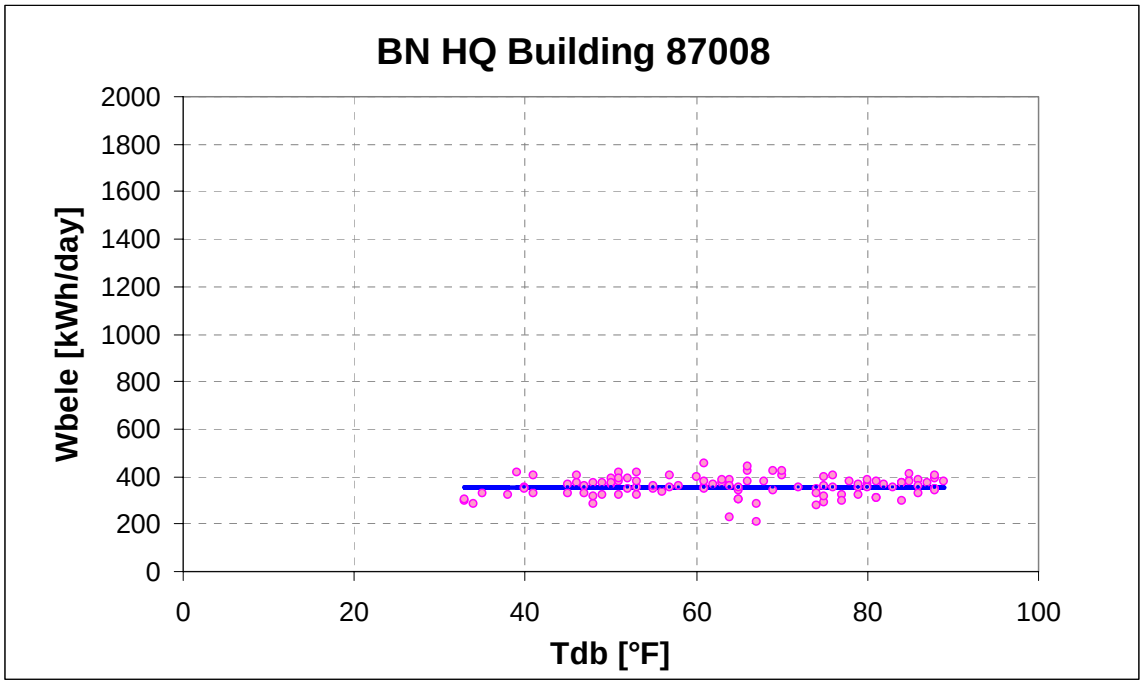


12.2.6.2. Baseline Model From Manual Readings

87008

Path and name of input data file = 8700BLCKbldg2_.prn
Value of no-data flag = -99
Column number of group field = 12
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable = 6
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 11
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg2_.prn
    Model type =           Mean
    Grouping column No =   12
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      6
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    105
       Ymean =   355.675
      StdDev =    41.722
    CV-StDev =    11.730 %
```


BN HQ Building 87008
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

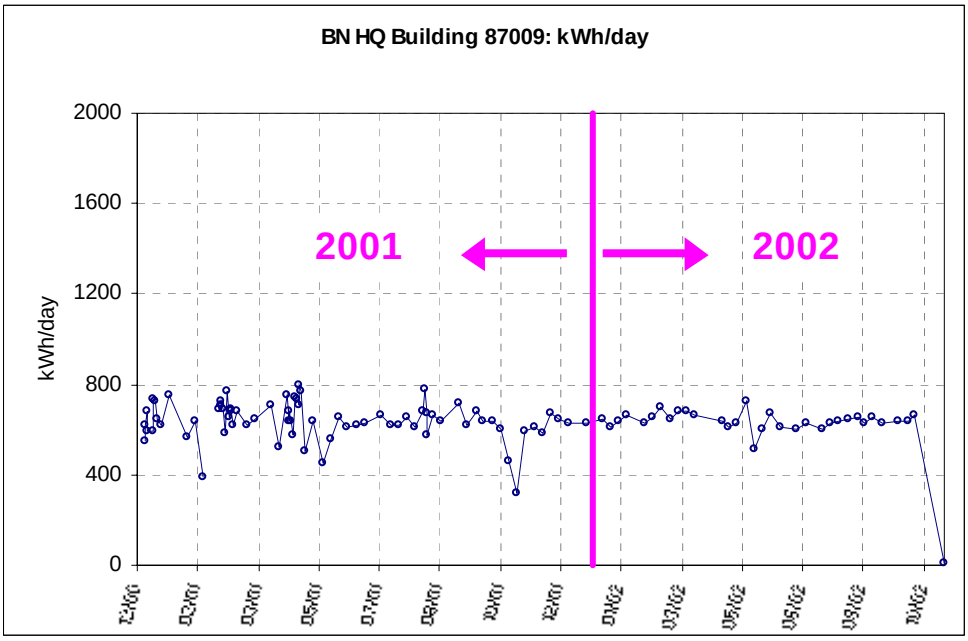
12.2.7. 87009 BN HQ Building

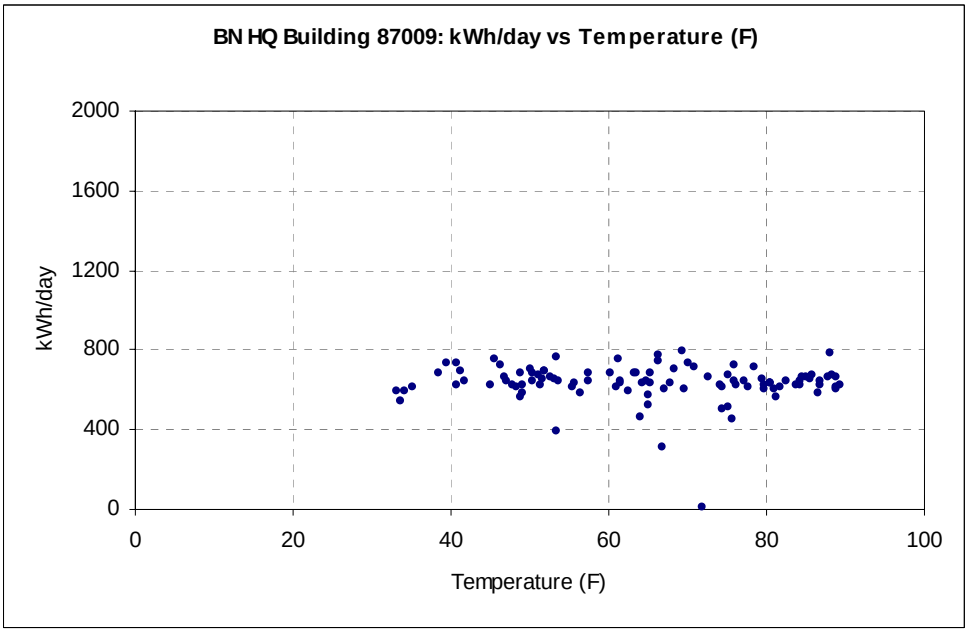
12.2.7.1. Electricity Use From Manual Readings

Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/27/2000	1	17066	17611	545	545	33.7
12/28/2000	1	17611	18228	617	617	35.2
12/29/2000	1	18228	18910	682	682	38.6
1/2/2001	4	18910	21271	2361	590	34.3
1/3/2001	1	21271	21863	592	592	33.1
1/4/2001	1	21863	22600	737	737	40.7
1/5/2001	1	22600	23323	723	723	46.4
1/9/2001	4	23323	25899	2576	644	47.2
1/16/2001	7	25899	30253	4354	622	45.1
1/30/2001	14	30253	40788	10535	753	45.6
2/6/2001	7	40788	44750	3962	566	49.0
2/13/2001	7	44750	49239	4489	641	53.6
2/26/2001	13	49239	54340	5101	392	53.5
						58.5
2/27/2001	1	54340	55027	687	687	60.2
2/28/2001	1	55027	55731	704	704	50.1
3/1/2001	1	55731	56460	729	729	39.6
3/2/2001	1	56460	57151	691	691	41.3
3/5/2001	3	57151	58902	1751	584	49.0
3/6/2001	1	58902	59670	768	768	53.3
3/7/2001	1	59670	60322	652	652	53.2
3/8/2001	1	60322	61011	689	689	51.8
3/9/2001	1	61011	61695	684	684	50.4
3/13/2001	4	61695	64157	2462	616	55.4
3/20/2001	7	64157	68916	4759	680	48.8
3/27/2001	7	68916	73283	4367	624	51.4
4/10/2001	14	73283	82343	9060	647	61.4
4/17/2001	7	82343	87269	4926	704	68.3
4/23/2001	6	87269	90391	3122	520	65.0
4/24/2001	1	90391	91143	752	752	61.3
4/25/2001	1	91143	91777	634	634	61.4
4/26/2001	1	91777	92456	679	679	63.2
4/27/2001	1	92456	93089	633	633	64.3
4/30/2001	3	93089	94802	1713	571	65.1
5/1/2001	1	94802	95545	743	743	66.4
5/2/2001	1	95545	96279	734	734	70.1
5/3/2001	1	96279	96989	710	710	70.9
5/4/2001	1	96989	97783	794	794	69.3
5/8/2001	4	97783	100875	3092	773	66.4
5/15/2001	7	100875	104384	3509	501	74.4
5/22/2001	7	104384	108859	4475	639	75.9
5/29/2001	7	108859	111992	3133	448	75.6
6/5/2001	7	111992	115921	3929	561	81.2
6/12/2001	7	115921	120511	4590	656	79.6
6/19/2001	7	120511	124769	4258	608	81.7
6/26/2001	7	124769	129135	4366	624	79.7
7/10/2001	14	129135	137871	8736	624	84.4
7/17/2001	7	137871	142512	4641	663	88.9

7/24/2001	7	142512	146861	4349	621	89.4
7/31/2001	7	146861	151187	4326	618	88.8
8/7/2001	7	151187	155800	4613	659	87.8
8/13/2001	6	155800	159447	3647	608	88.9
8/15/2001	2	159447	160802	1355	678	88.4
8/16/2001	1	160802	161584	782	782	88.0
8/17/2001	1	161584	162256	672	672	85.8
8/21/2001	4	162256	164574	2318	580	86.6
8/28/2001	7	164574	169204	4630	661	84.5
9/11/2001	14	169204	178171	8967	641	77.2
9/18/2001	7	178171	183200	5029	718	78.6
9/26/2001	8	183200	188185	4985	623	74.2
10/2/2001	6	188185	192259	4074	679	65.2
10/10/2001	8	192259	197353	5094	637	67.7
10/16/2001	6	197353	201198	3845	641	64.9
10/23/2001	7	201198	205400	4202	600	67.2
10/30/2001	7	205400	208642	3242	463	64.1
11/6/2001	7	208642	210854	2212	316	66.7
11/14/2001	8	210854	215624	4770	596	62.6
11/20/2001	6	215624	219273	3649	608	61.1
11/27/2001	7	219273	223380	4107	587	56.4
12/4/2001	7	223380	228066	4686	669	51.1
12/12/2001	8	228066	233230	5164	646	57.4
12/26/2001	14	233230	241967	8737	624	49.1
1/8/2002	13	241967	250131	8164	628	40.7
1/15/2002	7	250131	254635	4504	643	50.4
1/22/2002	7	254635	258934	4299	614	48.5
1/29/2002	7	258934	263399	4465	638	55.8
2/12/2002	14	263399	272682	9283	663	46.9
2/19/2002	7	272682	277063	4381	626	47.9
2/26/2002	7	277063	281668	4605	658	51.6
3/5/2002	7	281668	286546	4878	697	52.0
3/12/2002	7	286546	291055	4509	644	41.8
3/19/2002	7	291055	295807	4752	679	57.5
3/26/2002	7	295807	300565	4758	680	63.6
4/17/2002	22	300565	315187	14622	665	52.7
4/23/2002	6	315187	318989	3802	634	65.2
4/30/2002	7	318989	323263	4274	611	74.4
5/7/2002	7	323263	327658	4395	628	76.2
5/14/2002	7	327658	332750	5092	727	76.0
5/21/2002	7	332750	336368	3618	517	75.2
5/28/2002	7	336368	340580	4212	602	69.5
6/4/2002	7	340580	345291	4711	673	75.1
6/18/2002	14	345291	353858	8567	612	77.7
6/26/2002	8	353858	358693	4835	604	81.1
7/9/2002	13	358693	366867	8174	629	80.6
7/16/2002	7	366867	371087	4220	603	79.7
7/23/2002	7	371087	375490	4403	629	80.4
7/31/2002	8	375490	380608	5118	640	84.3
8/8/2002	8	380608	385768	5160	645	87.0
8/13/2002	5	385768	389039	3271	654	85.6
8/20/2002	7	389039	393411	4372	625	83.7
8/27/2002	7	393411	398023	4612	659	85.0
9/10/2002	14	398023	406765	8742	624	86.9

9/18/2002	8	406765	411878	5113	639	82.4
9/24/2002	6	411878	415680	3802	634	80.4
10/18/2002	24	415680	431709	16029	668	72.6
1/0/1900	####	431709	0	-431709	11	71.8





12.2.7.2. Baseline Model From Manual Readings

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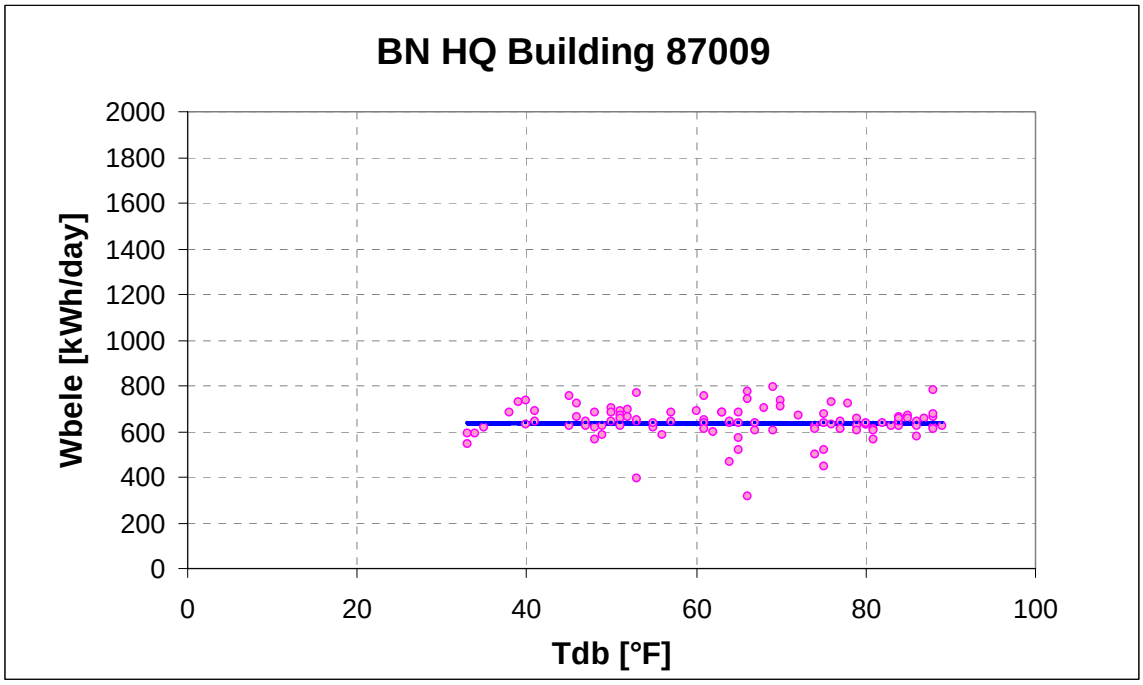
Value of no-data flag = -99
Column number of group field = 12
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable = 7
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 11
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg2_.prn
    Model type =           Mean
    Grouping column No =   12
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      7
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    104
       Ymean =   638.907
      StdDev =    72.788
    CV-StDev =    11.393 %
```


BN HQ Building 87009
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

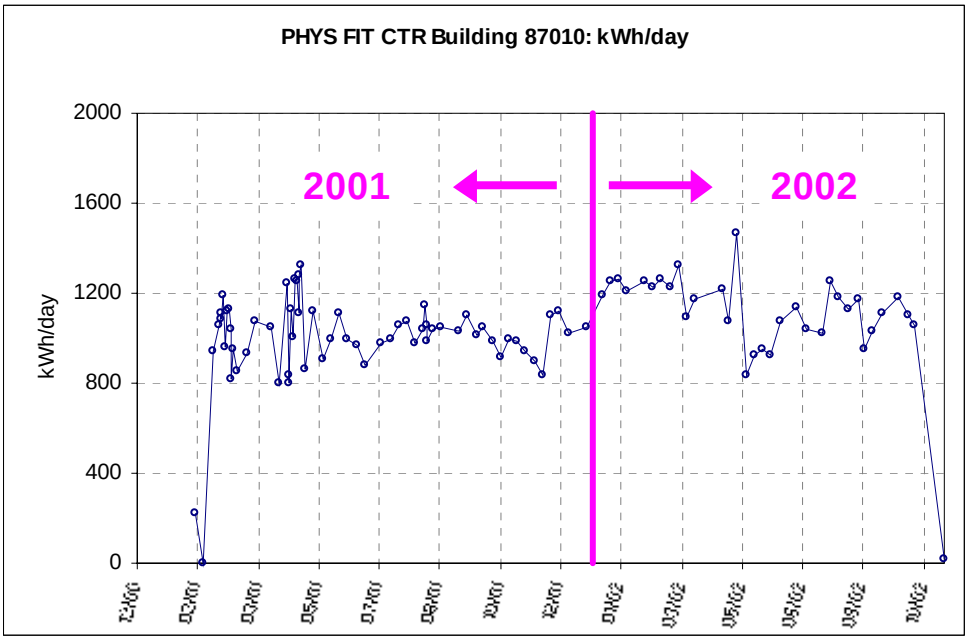
12.2.8. 87010 PHYS FIT CTR Building

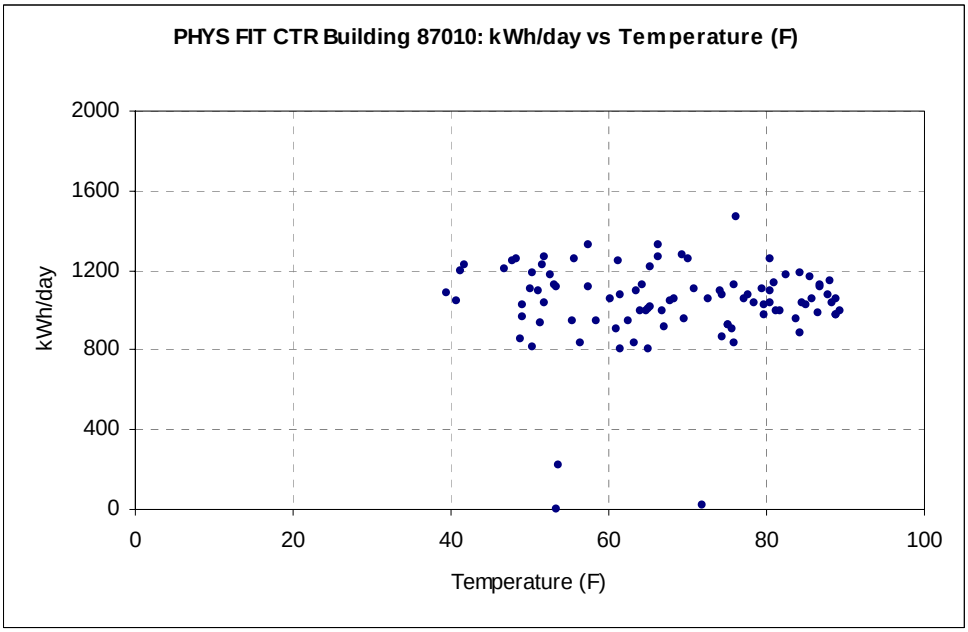
12.2.8.1. Electricity Use From Manual Readings

87010		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/26/2000	36886		12/26/2000	12/27/2000	1					33.7
12/27/2000	36887		12/27/2000	12/28/2000	1					35.2
12/28/2000	36888		12/28/2000	12/29/2000	1					38.6
12/29/2000	36889		12/29/2000	1/2/2001	4					34.3
1/2/2001	36893		1/2/2001	1/3/2001	1					33.1
1/3/2001	36894		1/3/2001	1/4/2001	1					40.7
1/4/2001	36895		1/4/2001	1/5/2001	1					46.4
1/5/2001	36896		1/5/2001	1/9/2001	4					47.2
1/9/2001	36900		1/9/2001	1/16/2001	7					45.1
1/16/2001	36907		1/16/2001	1/30/2001	14					45.6
1/30/2001	36921		1/30/2001	2/6/2001	7					49.0
2/6/2001	36928	5112	2/6/2001	2/13/2001	7	5112	6692	1580	226	53.6
2/13/2001	36935	6692	2/13/2001	2/20/2001	7	6692	6693	1	0.143	53.5
2/20/2001	36942	6693	2/20/2001	2/26/2001	6	6693	12335	5642	940	58.5
2/26/2001	36948	12335	2/26/2001	2/27/2001	1	12335	13393	1058	1058	60.2
2/27/2001	36949	13393	2/27/2001	2/28/2001	1	13393	14502	1109	1109	50.1
2/28/2001	36950	14502	2/28/2001	3/1/2001	1	14502	15585	1083	1083	39.6
3/1/2001	36951	15585	3/1/2001	3/2/2001	1	15585	16778	1193	1193	41.3
3/2/2001	36952	16778	3/2/2001	3/5/2001	3	16778	19666	2888	963	49.0
3/5/2001	36955	19666	3/5/2001	3/6/2001	1	19666	20785	1119	1119	53.3
3/6/2001	36956	20785	3/6/2001	3/7/2001	1	20785	21910	1125	1125	53.2
3/7/2001	36957	21910	3/7/2001	3/8/2001	1	21910	22948	1038	1038	51.8
3/8/2001	36958	22948	3/8/2001	3/9/2001	1	22948	23766	818	818	50.4
3/9/2001	36959	23766	3/9/2001	3/13/2001	4	23766	27557	3791	948	55.4
3/13/2001	36963	27557	3/13/2001	3/20/2001	7	27557	33526	5969	853	48.8
3/20/2001	36970	33526	3/20/2001	3/27/2001	7	33526	40045	6519	931	51.4
3/27/2001	36977	40045	3/27/2001	4/10/2001	14	40045	55097	15052	1075	61.4
4/10/2001	36991	55097	4/10/2001	4/17/2001	7	55097	62463	7366	1052	68.3
4/17/2001	36998	62463	4/17/2001	4/23/2001	6	62463	67279	4816	803	65.0
4/23/2001	37004	67279	4/23/2001	4/24/2001	1	67279	68525	1246	1246	61.3
4/24/2001	37005	68525	4/24/2001	4/25/2001	1	68525	69326	801	801	61.4
4/25/2001	37006	69326	4/25/2001	4/26/2001	1	69326	70165	839	839	63.2
4/26/2001	37007	70165	4/26/2001	4/27/2001	1	70165	71294	1129	1129	64.3
4/27/2001	37008	71294	4/27/2001	4/30/2001	3	71294	74306	3012	1004	65.1
4/30/2001	37011	74306	4/30/2001	5/1/2001	1	74306	75570	1264	1264	66.4
5/1/2001	37012	75570	5/1/2001	5/2/2001	1	75570	76826	1256	1256	70.1
5/2/2001	37013	76826	5/2/2001	5/3/2001	1	76826	77935	1109	1109	70.9
5/3/2001	37014	77935	5/3/2001	5/4/2001	1	77935	79211	1276	1276	69.3
5/4/2001	37015	79211	5/4/2001	5/8/2001	4	79211	84520	5309	1327	66.4
5/8/2001	37019	84520	5/8/2001	5/15/2001	7	84520	90543	6023	860	74.4
5/15/2001	37026	90543	5/15/2001	5/22/2001	7	90543	98403	7860	1123	75.9
5/22/2001	37033	98403	5/22/2001	5/29/2001	7	98403	104756	6353	908	75.6
5/29/2001	37040	104756	5/29/2001	6/5/2001	7	104756	111730	6974	996	81.2
6/5/2001	37047	111730	6/5/2001	6/12/2001	7	111730	119488	7758	1108	79.6
6/12/2001	37054	119488	6/12/2001	6/19/2001	7	119488	126477	6989	998	81.7
6/19/2001	37061	126477	6/19/2001	6/26/2001	7	126477	133267	6790	970	79.7
6/26/2001	37068	133267	6/26/2001	7/10/2001	14	133267	145611	12344	882	84.4
7/10/2001	37082	145611	7/10/2001	7/17/2001	7	145611	152462	6851	979	88.9

7/17/2001	37089	152462	7/17/2001	7/24/2001	7	152462	159444	6982	997	89.4
7/24/2001	37096	159444	7/24/2001	7/31/2001	7	159444	166826	7382	1055	88.8
7/31/2001	37103	166826	7/31/2001	8/7/2001	7	166826	174358	7532	1076	87.8
8/7/2001	37110	174358	8/7/2001	8/13/2001	6	174358	180236	5878	980	88.9
8/13/2001	37116	180236	8/13/2001	8/15/2001	2	180236	182314	2078	1039	88.4
8/15/2001	37118	182314	8/15/2001	8/16/2001	1	182314	183459	1145	1145	88.0
8/16/2001	37119	183459	8/16/2001	8/17/2001	1	183459	184516	1057	1057	85.8
8/17/2001	37120	184516	8/17/2001	8/21/2001	4	184516	188467	3951	988	86.6
8/21/2001	37124	188467	8/21/2001	8/28/2001	7	188467	195726	7259	1037	84.5
8/28/2001	37131	195726	8/28/2001	9/11/2001	14	195726	210458	14732	1052	77.2
9/11/2001	37145	210458	9/11/2001	9/18/2001	7	210458	217675	7217	1031	78.6
9/18/2001	37152	217675	9/18/2001	9/26/2001	8	217675	226470	8795	1099	74.2
9/26/2001	37160	226470	9/26/2001	10/2/2001	6	226470	232568	6098	1016	65.2
10/2/2001	37166	232568	10/2/2001	10/10/2001	8	232568	240953	8385	1048	67.7
10/10/2001	37174	240953	10/10/2001	10/16/2001	6	240953	246895	5942	990	64.9
10/16/2001	37180	246895	10/16/2001	10/23/2001	7	246895	253309	6414	916	67.2
10/23/2001	37187	253309	10/23/2001	10/30/2001	7	253309	260274	6965	995	64.1
10/30/2001	37194	260274	10/30/2001	11/6/2001	7	260274	267209	6935	991	66.7
11/6/2001	37201	267209	11/6/2001	11/14/2001	8	267209	274752	7543	943	62.6
11/14/2001	37209	274752	11/14/2001	11/20/2001	6	274752	280150	5398	900	61.1
11/20/2001	37215	280150	11/20/2001	11/27/2001	7	280150	286000	5850	836	56.4
11/27/2001	37222	286000	11/27/2001	12/4/2001	7	286000	293689	7689	1098	51.1
12/4/2001	37229	293689	12/4/2001	12/12/2001	8	293689	302632	8943	1118	57.4
12/12/2001	37237	302632	12/12/2001	12/26/2001	14	302632	316948	14316	1023	49.1
12/26/2001	37251	316948	12/26/2001	1/8/2002	13	316948	330553	13605	1047	40.7
1/8/2002	37264	330553	1/8/2002	1/15/2002	7	330553	338861	8308	1187	50.4
1/15/2002	37271	338861	1/15/2002	1/22/2002	7	338861	347645	8784	1255	48.5
1/22/2002	37278	347645	1/22/2002	1/29/2002	7	347645	356466	8821	1260	55.8
1/29/2002	37285	356466	1/29/2002	2/12/2002	14	356466	373353	16887	1206	46.9
2/12/2002	37299	373353	2/12/2002	2/19/2002	7	373353	382099	8746	1249	47.9
2/19/2002	37306	382099	2/19/2002	2/26/2002	7	382099	390662	8563	1223	51.6
2/26/2002	37313	390662	2/26/2002	3/5/2002	7	390662	399525	8863	1266	52.0
3/5/2002	37320	399525	3/5/2002	3/12/2002	7	399525	408095	8570	1224	41.8
3/12/2002	37327	408095	3/12/2002	3/19/2002	7	408095	417371	9276	1325	57.5
3/19/2002	37334	417371	3/19/2002	3/26/2002	7	417371	425031	7660	1094	63.6
3/26/2002	37341	425031	3/26/2002	4/17/2002	22	425031	450860	25829	1174	52.7
4/17/2002	37363	450860	4/17/2002	4/23/2002	6	450860	458163	7303	1217	65.2
4/23/2002	37369	458163	4/23/2002	4/30/2002	7	458163	465665	7502	1072	74.4
4/30/2002	37376	465665	4/30/2002	5/7/2002	7	465665	475933	10268	1467	76.2
5/7/2002	37383	475933	5/7/2002	5/14/2002	7	475933	481764	5831	833	76.0
5/14/2002	37390	481764	5/14/2002	5/21/2002	7	481764	488228	6464	923	75.2
5/21/2002	37397	488228	5/21/2002	5/28/2002	7	488228	494892	6664	952	69.5
5/28/2002	37404	494892	5/28/2002	6/4/2002	7	494892	501362	6470	924	75.1
6/4/2002	37411	501362	6/4/2002	6/18/2002	14	501362	516399	15037	1074	77.7
6/18/2002	37425	516399	6/18/2002	6/26/2002	8	516399	525472	9073	1134	81.1
6/26/2002	37433	525472	6/26/2002	7/9/2002	13	525472	538979	13507	1039	80.6
7/9/2002	37446	538979	7/9/2002	7/16/2002	7	538979	546122	7143	1020	79.7
7/16/2002	37453	546122	7/16/2002	7/23/2002	7	546122	554923	8801	1257	80.4
7/23/2002	37460	554923	7/23/2002	7/31/2002	8	554923	564372	9449	1181	84.3
7/31/2002	37468	564372	7/31/2002	8/8/2002	8	564372	573373	9001	1125	87.0
8/8/2002	37476	573373	8/8/2002	8/13/2002	5	573373	579222	5849	1170	85.6
8/13/2002	37481	579222	8/13/2002	8/20/2002	7	579222	585879	6657	951	83.7
8/20/2002	37488	585879	8/20/2002	8/27/2002	7	585879	593085	7206	1029	85.0
8/27/2002	37495	593085	8/27/2002	9/10/2002	14	593085	608660	15575	1113	86.9

9/10/2002	37509	608660	9/10/2002	9/18/2002	8	608660	618103	9443	1180	82.4
9/18/2002	37517	618103	9/18/2002	9/24/2002	6	618103	624705	6602	1100	80.4
9/24/2002	37523	624705	9/24/2002	10/18/2002	24	624705	650036	25331	1055	72.6
10/18/2002	37547	650036	10/18/2002	1/0/1900	####	650036	0	-650036	17	71.8

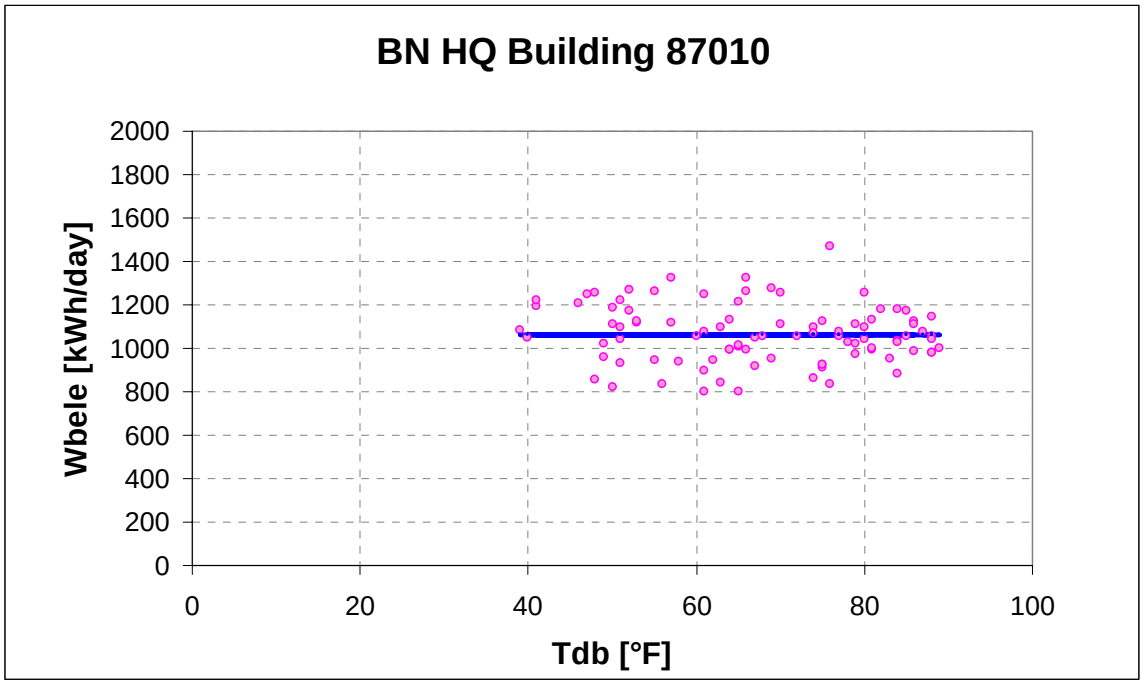




12.2.8.2. Baseline Model From Manual Readings

```
87010
Path and name of input data file = 8700BLCKbldg2_.prn
Value of no-data flag = -99
Column number of group field = 12
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable = 8
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 11
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg2_.prn
    Model type =           Mean
    Grouping column No =   12
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      8
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     92
       Ymean =  1064.600
      StdDev =   133.494
    CV-StDev =    12.539 %
```


BN HQ Building 87010
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

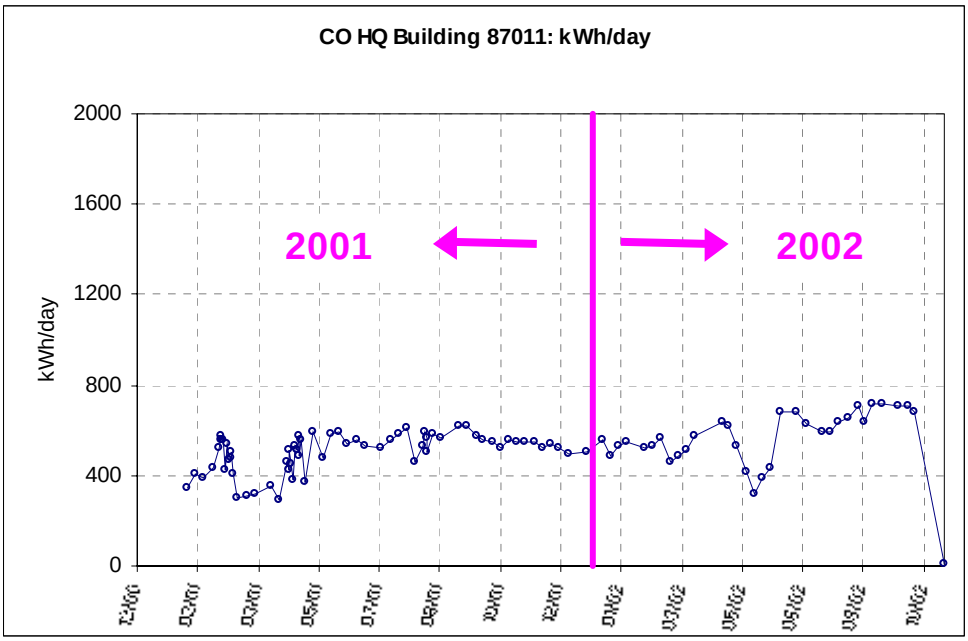
12.2.9. 87011 CO HQ Building

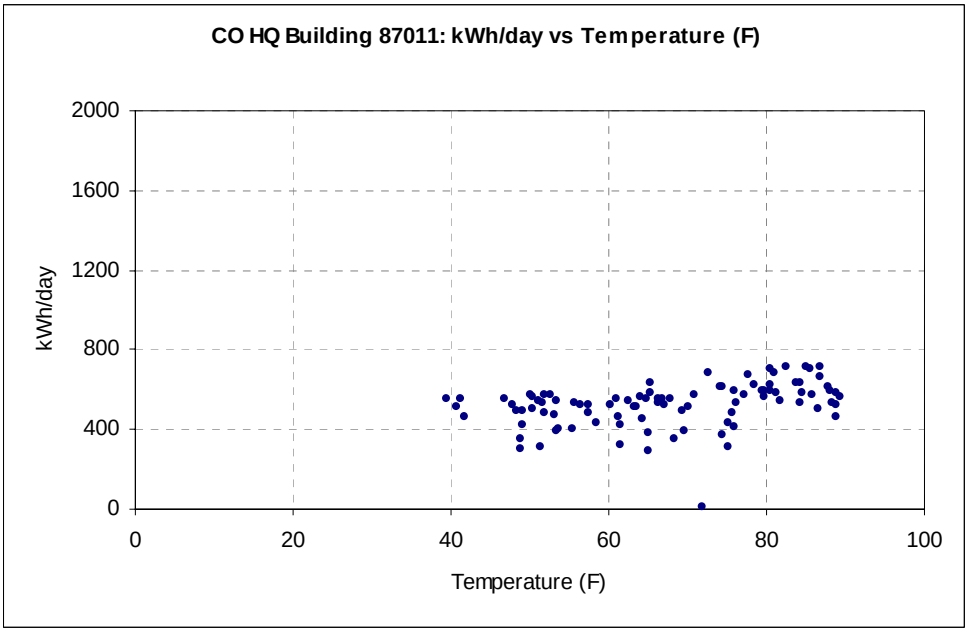
12.2.9.1. Electricity Use From Manual Readings

87011		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/26/2000	36886		12/26/2000	12/27/2000	1					33.7
12/27/2000	36887		12/27/2000	12/28/2000	1					35.2
12/28/2000	36888		12/28/2000	12/29/2000	1					38.6
12/29/2000	36889		12/29/2000	1/2/2001	4					34.3
1/2/2001	36893		1/2/2001	1/3/2001	1					33.1
1/3/2001	36894		1/3/2001	1/4/2001	1					40.7
1/4/2001	36895		1/4/2001	1/5/2001	1					46.4
1/5/2001	36896		1/5/2001	1/9/2001	4					47.2
1/9/2001	36900		1/9/2001	1/16/2001	7					45.1
1/16/2001	36907		1/16/2001	1/30/2001	14					45.6
1/30/2001	36921	6160	1/30/2001	2/6/2001	7	6160	8596	2436	348	49.0
2/6/2001	36928	8596	2/6/2001	2/13/2001	7	8596	11443	2847	407	53.6
2/13/2001	36935	11443	2/13/2001	2/20/2001	7	11443	14162	2719	388	53.5
2/20/2001	36942	14162	2/20/2001	2/26/2001	6	14162	16782	2620	437	58.5
2/26/2001	36948	16782	2/26/2001	2/27/2001	1	16782	17303	521	521	60.2
2/27/2001	36949	17303	2/27/2001	2/28/2001	1	17303	17874	571	571	50.1
2/28/2001	36950	17874	2/28/2001	3/1/2001	1	17874	18428	554	554	39.6
3/1/2001	36951	18428	3/1/2001	3/2/2001	1	18428	18983	555	555	41.3
3/2/2001	36952	18983	3/2/2001	3/5/2001	3	18983	20247	1264	421	49.0
3/5/2001	36955	20247	3/5/2001	3/6/2001	1	20247	20786	539	539	53.3
3/6/2001	36956	20786	3/6/2001	3/7/2001	1	20786	21254	468	468	53.2
3/7/2001	36957	21254	3/7/2001	3/8/2001	1	21254	21734	480	480	51.8
3/8/2001	36958	21734	3/8/2001	3/9/2001	1	21734	22240	506	506	50.4
3/9/2001	36959	22240	3/9/2001	3/13/2001	4	22240	23858	1618	405	55.4
3/13/2001	36963	23858	3/13/2001	3/20/2001	7	23858	25942	2084	298	48.8
3/20/2001	36970	25942	3/20/2001	3/27/2001	7	25942	28111	2169	310	51.4
3/27/2001	36977	28111	3/27/2001	4/10/2001	14	28111	32559	4448	318	61.4
4/10/2001	36991	32559	4/10/2001	4/17/2001	7	32559	35043	2484	355	68.3
4/17/2001	36998	35043	4/17/2001	4/23/2001	6	35043	36796	1753	292	65.0
4/23/2001	37004	36796	4/23/2001	4/24/2001	1	36796	37260	464	464	61.3
4/24/2001	37005	37260	4/24/2001	4/25/2001	1	37260	37686	426	426	61.4
4/25/2001	37006	37686	4/25/2001	4/26/2001	1	37686	38201	515	515	63.2
4/26/2001	37007	38201	4/26/2001	4/27/2001	1	38201	38656	455	455	64.3
4/27/2001	37008	38656	4/27/2001	4/30/2001	3	38656	39795	1139	380	65.1
4/30/2001	37011	39795	4/30/2001	5/1/2001	1	39795	40330	535	535	66.4
5/1/2001	37012	40330	5/1/2001	5/2/2001	1	40330	40845	515	515	70.1
5/2/2001	37013	40845	5/2/2001	5/3/2001	1	40845	41420	575	575	70.9
5/3/2001	37014	41420	5/3/2001	5/4/2001	1	41420	41910	490	490	69.3
5/4/2001	37015	41910	5/4/2001	5/8/2001	4	41910	44137	2227	557	66.4
5/8/2001	37019	44137	5/8/2001	5/15/2001	7	44137	46719	2582	369	74.4
5/15/2001	37026	46719	5/15/2001	5/22/2001	7	46719	50877	4158	594	75.9
5/22/2001	37033	50877	5/22/2001	5/29/2001	7	50877	54240	3363	480	75.6
5/29/2001	37040	54240	5/29/2001	6/5/2001	7	54240	58325	4085	584	81.2
6/5/2001	37047	58325	6/5/2001	6/12/2001	7	58325	62454	4129	590	79.6
6/12/2001	37054	62454	6/12/2001	6/19/2001	7	62454	66260	3806	544	81.7
6/19/2001	37061	66260	6/19/2001	6/26/2001	7	66260	70170	3910	559	79.7
6/26/2001	37068	70170	6/26/2001	7/10/2001	14	70170	77595	7425	530	84.4
7/10/2001	37082	77595	7/10/2001	7/17/2001	7	77595	81275	3680	526	88.9

7/17/2001	37089	81275	7/17/2001	7/24/2001	7	81275	85201	3926	561	89.4
7/24/2001	37096	85201	7/24/2001	7/31/2001	7	85201	89310	4109	587	88.8
7/31/2001	37103	89310	7/31/2001	8/7/2001	7	89310	93606	4296	614	87.8
8/7/2001	37110	93606	8/7/2001	8/13/2001	6	93606	96363	2757	460	88.9
8/13/2001	37116	96363	8/13/2001	8/15/2001	2	96363	97420	1057	529	88.4
8/15/2001	37118	97420	8/15/2001	8/16/2001	1	97420	98013	593	593	88.0
8/16/2001	37119	98013	8/16/2001	8/17/2001	1	98013	98583	570	570	85.8
8/17/2001	37120	98583	8/17/2001	8/21/2001	4	98583	100600	2017	504	86.6
8/21/2001	37124	100600	8/21/2001	8/28/2001	7	100600	104689	4089	584	84.5
8/28/2001	37131	104689	8/28/2001	9/11/2001	14	104689	112644	7955	568	77.2
9/11/2001	37145	112644	9/11/2001	9/18/2001	7	112644	116976	4332	619	78.6
9/18/2001	37152	116976	9/18/2001	9/26/2001	8	116976	121899	4923	615	74.2
9/26/2001	37160	121899	9/26/2001	10/2/2001	6	121899	125376	3477	580	65.2
10/2/2001	37166	125376	10/2/2001	10/10/2001	8	125376	129823	4447	556	67.7
10/10/2001	37174	129823	10/10/2001	10/16/2001	6	129823	133128	3305	551	64.9
10/16/2001	37180	133128	10/16/2001	10/23/2001	7	133128	136797	3669	524	67.2
10/23/2001	37187	136797	10/23/2001	10/30/2001	7	136797	140726	3929	561	64.1
10/30/2001	37194	140726	10/30/2001	11/6/2001	7	140726	144580	3854	551	66.7
11/6/2001	37201	144580	11/6/2001	11/14/2001	8	144580	148946	4366	546	62.6
11/14/2001	37209	148946	11/14/2001	11/20/2001	6	148946	152247	3301	550	61.1
11/20/2001	37215	152247	11/20/2001	11/27/2001	7	152247	155898	3651	522	56.4
11/27/2001	37222	155898	11/27/2001	12/4/2001	7	155898	159688	3790	541	51.1
12/4/2001	37229	159688	12/4/2001	12/12/2001	8	159688	163870	4182	523	57.4
12/12/2001	37237	163870	12/12/2001	12/26/2001	14	163870	170812	6942	496	49.1
12/26/2001	37251	170812	12/26/2001	1/8/2002	13	170812	177421	6609	508	40.7
1/8/2002	37264	177421	1/8/2002	1/15/2002	7	177421	181327	3906	558	50.4
1/15/2002	37271	181327	1/15/2002	1/22/2002	7	181327	184758	3431	490	48.5
1/22/2002	37278	184758	1/22/2002	1/29/2002	7	184758	188470	3712	530	55.8
1/29/2002	37285	188470	1/29/2002	2/12/2002	14	188470	196168	7698	550	46.9
2/12/2002	37299	196168	2/12/2002	2/19/2002	7	196168	199806	3638	520	47.9
2/19/2002	37306	199806	2/19/2002	2/26/2002	7	199806	203501	3695	528	51.6
2/26/2002	37313	203501	2/26/2002	3/5/2002	7	203501	207481	3980	569	52.0
3/5/2002	37320	207481	3/5/2002	3/12/2002	7	207481	210733	3252	465	41.8
3/12/2002	37327	210733	3/12/2002	3/19/2002	7	210733	214125	3392	485	57.5
3/19/2002	37334	214125	3/19/2002	3/26/2002	7	214125	217730	3605	515	63.6
3/26/2002	37341	217730	3/26/2002	4/17/2002	22	217730	230435	12705	578	52.7
4/17/2002	37363	230435	4/17/2002	4/23/2002	6	230435	234249	3814	636	65.2
4/23/2002	37369	234249	4/23/2002	4/30/2002	7	234249	238573	4324	618	74.4
4/30/2002	37376	238573	4/30/2002	5/7/2002	7	238573	242293	3720	531	76.2
5/7/2002	37383	242293	5/7/2002	5/14/2002	7	242293	245184	2891	413	76.0
5/14/2002	37390	245184	5/14/2002	5/21/2002	7	245184	247386	2202	315	75.2
5/21/2002	37397	247386	5/21/2002	5/28/2002	7	247386	250115	2729	390	69.5
5/28/2002	37404	250115	5/28/2002	6/4/2002	7	250115	253137	3022	432	75.1
6/4/2002	37411	253137	6/4/2002	6/18/2002	14	253137	262621	9484	677	77.7
6/18/2002	37425	262621	6/18/2002	6/26/2002	8	262621	268080	5459	682	81.1
6/26/2002	37433	268080	6/26/2002	7/9/2002	13	268080	276198	8118	624	80.6
7/9/2002	37446	276198	7/9/2002	7/16/2002	7	276198	280328	4130	590	79.7
7/16/2002	37453	280328	7/16/2002	7/23/2002	7	280328	284484	4156	594	80.4
7/23/2002	37460	284484	7/23/2002	7/31/2002	8	284484	289588	5104	638	84.3
7/31/2002	37468	289588	7/31/2002	8/8/2002	8	289588	294859	5271	659	87.0
8/8/2002	37476	294859	8/8/2002	8/13/2002	5	294859	298380	3521	704	85.6
8/13/2002	37481	298380	8/13/2002	8/20/2002	7	298380	302817	4437	634	83.7
8/20/2002	37488	302817	8/20/2002	8/27/2002	7	302817	307820	5003	715	85.0
8/27/2002	37495	307820	8/27/2002	9/10/2002	14	307820	317808	9988	713	86.9

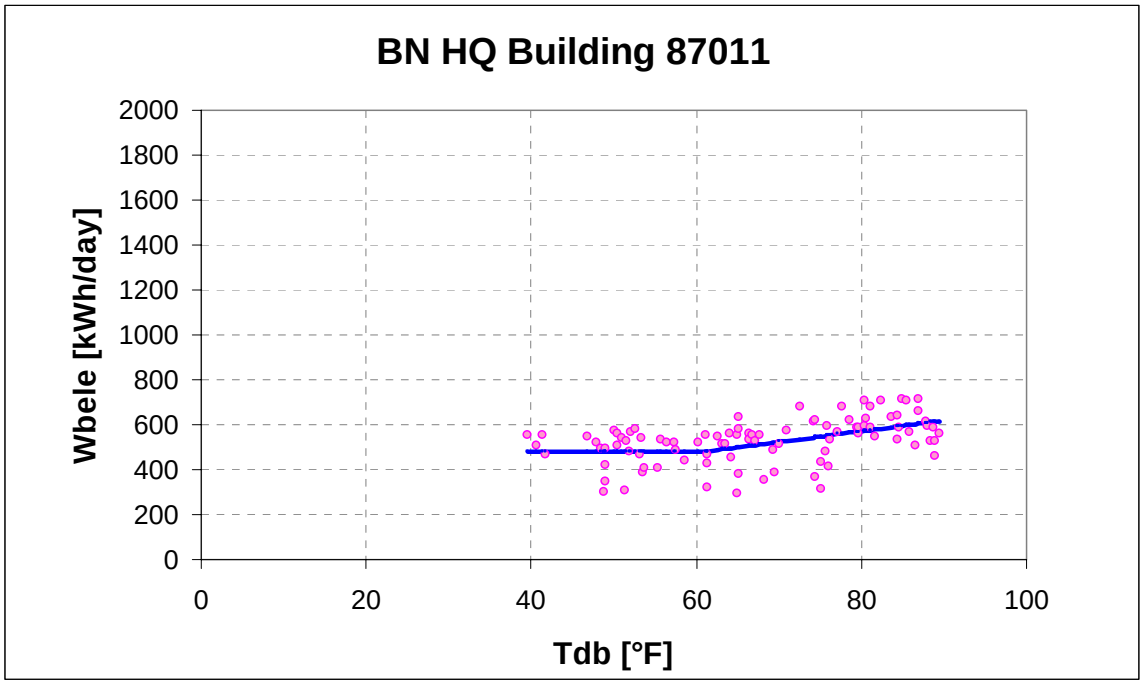
9/10/2002	37509	317808	9/10/2002	9/18/2002	8	317808	323480	5672	709	82.4
9/18/2002	37517	323480	9/18/2002	9/24/2002	6	323480	327724	4244	707	80.4
9/24/2002	37523	327724	9/24/2002	10/18/2002	24	327724	344106	16382	683	72.6
10/18/2002	37547	344106	10/18/2002	1/0/1900	#####	344106	0	-344106	9	71.8





12.2.9.2. Baseline Model From Manual Readings

```
87011
Path and name of input data file = 8700BLCKbldg2_.prn
Value of no-data flag = -99
Column number of group field = 12
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable =10
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 11
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg2_.prn
    Model type =           3P Cooling
    Grouping column No =   12
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =     10
    X1 column number =  11
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     95
          R2 =     0.236
       AdjR2 =     0.236
        RMSE =     85.6817
     CV-RMSE =    16.241%
           p =     0.616
          DW =     0.742 (p>0)
          N1 =     35
          N2 =     60
         Ycp =    482.3282 (     12.1913)
          LS =      0.0000 (      0.0000)
          RS =      4.7841 (      0.8931)
         Xcp =     61.5140 (      0.9970)
   --------------------------------
```


BN HQ Building 87011
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

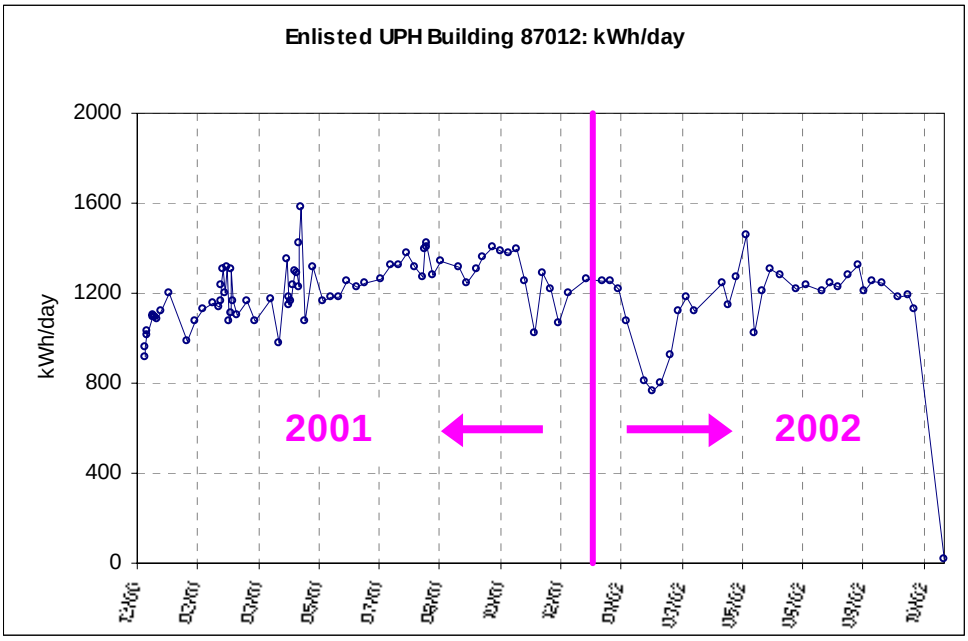
12.2.10. 87012 Enlisted UPH Building

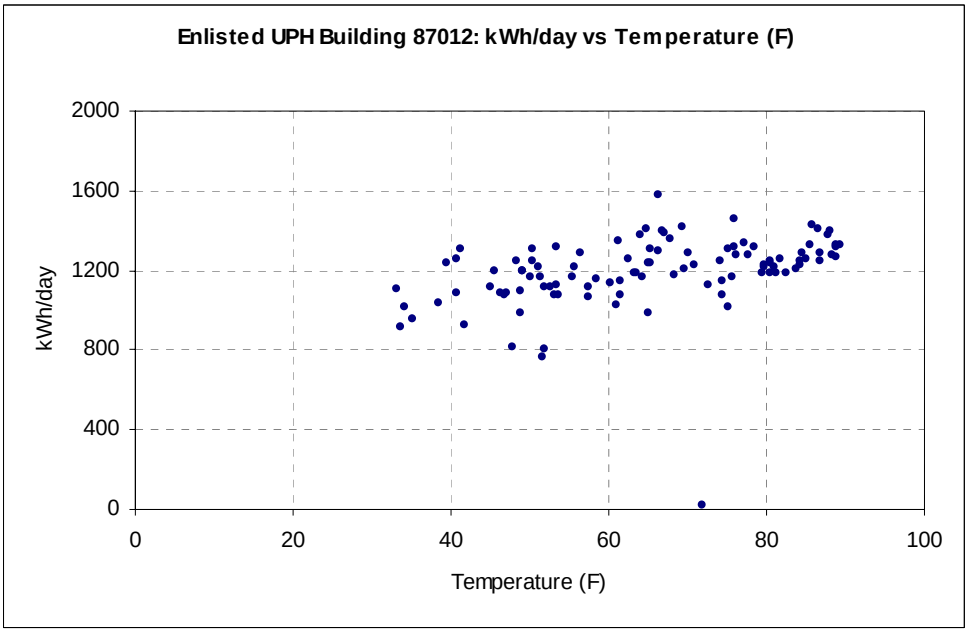
12.2.10.1. Electricity Use From Manual Readings

87012		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/26/2000	36886	29763	12/26/2000	12/27/2000	1	29763	30677	914	914	33.7
12/27/2000	36887	30677	12/27/2000	12/28/2000	1	30677	31635	958	958	35.2
12/28/2000	36888	31635	12/28/2000	12/29/2000	1	31635	32668	1033	1033	38.6
12/29/2000	36889	32668	12/29/2000	1/2/2001	4	32668	36730	4062	1016	34.3
1/2/2001	36893	36730	1/2/2001	1/3/2001	1	36730	37836	1106	1106	33.1
1/3/2001	36894	37836	1/3/2001	1/4/2001	1	37836	38926	1090	1090	40.7
1/4/2001	36895	38926	1/4/2001	1/5/2001	1	38926	40016	1090	1090	46.4
1/5/2001	36896	40016	1/5/2001	1/9/2001	4	40016	44339	4323	1081	47.2
1/9/2001	36900	44339	1/9/2001	1/16/2001	7	44339	52155	7816	1117	45.1
1/16/2001	36907	52155	1/16/2001	1/30/2001	14	52155	68905	16750	1196	45.6
1/30/2001	36921	68905	1/30/2001	2/6/2001	7	68905	75806	6901	986	49.0
2/6/2001	36928	75806	2/6/2001	2/13/2001	7	75806	83321	7515	1074	53.6
2/13/2001	36935	83321	2/13/2001	2/20/2001	7	83321	91225	7904	1129	53.5
2/20/2001	36942	91225	2/20/2001	2/26/2001	6	91225	98155	6930	1155	58.5
2/26/2001	36948	98155	2/26/2001	2/27/2001	1	98155	99293	1138	1138	60.2
2/27/2001	36949	99293	2/27/2001	2/28/2001	1	99293	100454	1161	1161	50.1
2/28/2001	36950	100454	2/28/2001	3/1/2001	1	100454	101691	1237	1237	39.6
3/1/2001	36951	101691	3/1/2001	3/2/2001	1	101691	102997	1306	1306	41.3
3/2/2001	36952	102997	3/2/2001	3/5/2001	3	102997	106587	3590	1197	49.0
3/5/2001	36955	106587	3/5/2001	3/6/2001	1	106587	107905	1318	1318	53.3
3/6/2001	36956	107905	3/6/2001	3/7/2001	1	107905	108982	1077	1077	53.2
3/7/2001	36957	108982	3/7/2001	3/8/2001	1	108982	110093	1111	1111	51.8
3/8/2001	36958	110093	3/8/2001	3/9/2001	1	110093	111396	1303	1303	50.4
3/9/2001	36959	111396	3/9/2001	3/13/2001	4	111396	116045	4649	1162	55.4
3/13/2001	36963	116045	3/13/2001	3/20/2001	7	116045	123734	7689	1098	48.8
3/20/2001	36970	123734	3/20/2001	3/27/2001	7	123734	131879	8145	1164	51.4
3/27/2001	36977	131879	3/27/2001	4/10/2001	14	131879	146995	15116	1080	61.4
4/10/2001	36991	146995	4/10/2001	4/17/2001	7	146995	155230	8235	1176	68.3
4/17/2001	36998	155230	4/17/2001	4/23/2001	6	155230	161120	5890	982	65.0
4/23/2001	37004	161120	4/23/2001	4/24/2001	1	161120	162470	1350	1350	61.3
4/24/2001	37005	162470	4/24/2001	4/25/2001	1	162470	163618	1148	1148	61.4
4/25/2001	37006	163618	4/25/2001	4/26/2001	1	163618	164804	1186	1186	63.2
4/26/2001	37007	164804	4/26/2001	4/27/2001	1	164804	165972	1168	1168	64.3
4/27/2001	37008	165972	4/27/2001	4/30/2001	3	165972	169673	3701	1234	65.1
4/30/2001	37011	169673	4/30/2001	5/1/2001	1	169673	170974	1301	1301	66.4
5/1/2001	37012	170974	5/1/2001	5/2/2001	1	170974	172259	1285	1285	70.1
5/2/2001	37013	172259	5/2/2001	5/3/2001	1	172259	173489	1230	1230	70.9
5/3/2001	37014	173489	5/3/2001	5/4/2001	1	173489	174908	1419	1419	69.3
5/4/2001	37015	174908	5/4/2001	5/8/2001	4	174908	181234	6326	1582	66.4
5/8/2001	37019	181234	5/8/2001	5/15/2001	7	181234	188734	7500	1071	74.4
5/15/2001	37026	188734	5/15/2001	5/22/2001	7	188734	197919	9185	1312	75.9
5/22/2001	37033	197919	5/22/2001	5/29/2001	7	197919	206069	8150	1164	75.6
5/29/2001	37040	206069	5/29/2001	6/5/2001	7	206069	214344	8275	1182	81.2
6/5/2001	37047	214344	6/5/2001	6/12/2001	7	214344	222638	8294	1185	79.6
6/12/2001	37054	222638	6/12/2001	6/19/2001	7	222638	231414	8776	1254	81.7
6/19/2001	37061	231414	6/19/2001	6/26/2001	7	231414	240024	8610	1230	79.7
6/26/2001	37068	240024	6/26/2001	7/10/2001	14	240024	257478	17454	1247	84.4
7/10/2001	37082	257478	7/10/2001	7/17/2001	7	257478	266311	8833	1262	88.9

7/17/2001	37089	266311	7/17/2001	7/24/2001	7	266311	275596	9285	1326	89.4
7/24/2001	37096	275596	7/24/2001	7/31/2001	7	275596	284870	9274	1325	88.8
7/31/2001	37103	284870	7/31/2001	8/7/2001	7	284870	294492	9622	1375	87.8
8/7/2001	37110	294492	8/7/2001	8/13/2001	6	294492	302406	7914	1319	88.9
8/13/2001	37116	302406	8/13/2001	8/15/2001	2	302406	304954	2548	1274	88.4
8/15/2001	37118	304954	8/15/2001	8/16/2001	1	304954	306347	1393	1393	88.0
8/16/2001	37119	306347	8/16/2001	8/17/2001	1	306347	307771	1424	1424	85.8
8/17/2001	37120	307771	8/17/2001	8/21/2001	4	307771	313404	5633	1408	86.6
8/21/2001	37124	313404	8/21/2001	8/28/2001	7	313404	322389	8985	1284	84.5
8/28/2001	37131	322389	8/28/2001	9/11/2001	14	322389	341131	18742	1339	77.2
9/11/2001	37145	341131	9/11/2001	9/18/2001	7	341131	350344	9213	1316	78.6
9/18/2001	37152	350344	9/18/2001	9/26/2001	8	350344	360316	9972	1247	74.2
9/26/2001	37160	360316	9/26/2001	10/2/2001	6	360316	368178	7862	1310	65.2
10/2/2001	37166	368178	10/2/2001	10/10/2001	8	368178	379041	10863	1358	67.7
10/10/2001	37174	379041	10/10/2001	10/16/2001	6	379041	387457	8416	1403	64.9
10/16/2001	37180	387457	10/16/2001	10/23/2001	7	387457	397189	9732	1390	67.2
10/23/2001	37187	397189	10/23/2001	10/30/2001	7	397189	406858	9669	1381	64.1
10/30/2001	37194	406858	10/30/2001	11/6/2001	7	406858	416614	9756	1394	66.7
11/6/2001	37201	416614	11/6/2001	11/14/2001	8	416614	426639	10025	1253	62.6
11/14/2001	37209	426639	11/14/2001	11/20/2001	6	426639	432784	6145	1024	61.1
11/20/2001	37215	432784	11/20/2001	11/27/2001	7	432784	441784	9000	1286	56.4
11/27/2001	37222	441784	11/27/2001	12/4/2001	7	441784	450329	8545	1221	51.1
12/4/2001	37229	450329	12/4/2001	12/12/2001	8	450329	458879	8550	1069	57.4
12/12/2001	37237	458879	12/12/2001	12/26/2001	14	458879	475656	16777	1198	49.1
12/26/2001	37251	475656	12/26/2001	1/8/2002	13	475656	492019	16363	1259	40.7
1/8/2002	37264	492019	1/8/2002	1/15/2002	7	492019	500773	8754	1251	50.4
1/15/2002	37271	500773	1/15/2002	1/22/2002	7	500773	509519	8746	1249	48.5
1/22/2002	37278	509519	1/22/2002	1/29/2002	7	509519	518049	8530	1219	55.8
1/29/2002	37285	518049	1/29/2002	2/12/2002	14	518049	533121	15072	1077	46.9
2/12/2002	37299	533121	2/12/2002	2/19/2002	7	533121	538800	5679	811	47.9
2/19/2002	37306	538800	2/19/2002	2/26/2002	7	538800	544162	5362	766	51.6
2/26/2002	37313	544162	2/26/2002	3/5/2002	7	544162	549772	5610	801	52.0
3/5/2002	37320	549772	3/5/2002	3/12/2002	7	549772	556268	6496	928	41.8
3/12/2002	37327	556268	3/12/2002	3/19/2002	7	556268	564081	7813	1116	57.5
3/19/2002	37334	564081	3/19/2002	3/26/2002	7	564081	572384	8303	1186	63.6
3/26/2002	37341	572384	3/26/2002	4/17/2002	22	572384	596948	24564	1117	52.7
4/17/2002	37363	596948	4/17/2002	4/23/2002	6	596948	604394	7446	1241	65.2
4/23/2002	37369	604394	4/23/2002	4/30/2002	7	604394	612410	8016	1145	74.4
4/30/2002	37376	612410	4/30/2002	5/7/2002	7	612410	621331	8921	1274	76.2
5/7/2002	37383	621331	5/7/2002	5/14/2002	7	621331	631539	10208	1458	76.0
5/14/2002	37390	631539	5/14/2002	5/21/2002	7	631539	638678	7139	1020	75.2
5/21/2002	37397	638678	5/21/2002	5/28/2002	7	638678	647136	8458	1208	69.5
5/28/2002	37404	647136	5/28/2002	6/4/2002	7	647136	656311	9175	1311	75.1
6/4/2002	37411	656311	6/4/2002	6/18/2002	14	656311	674243	17932	1281	77.7
6/18/2002	37425	674243	6/18/2002	6/26/2002	8	674243	683981	9738	1217	81.1
6/26/2002	37433	683981	6/26/2002	7/9/2002	13	683981	700004	16023	1233	80.6
7/9/2002	37446	700004	7/9/2002	7/16/2002	7	700004	708484	8480	1211	79.7
7/16/2002	37453	708484	7/16/2002	7/23/2002	7	708484	717205	8721	1246	80.4
7/23/2002	37460	717205	7/23/2002	7/31/2002	8	717205	727002	9797	1225	84.3
7/31/2002	37468	727002	7/31/2002	8/8/2002	8	727002	737272	10270	1284	87.0
8/8/2002	37476	737272	8/8/2002	8/13/2002	5	737272	743882	6610	1322	85.6
8/13/2002	37481	743882	8/13/2002	8/20/2002	7	743882	752349	8467	1210	83.7
8/20/2002	37488	752349	8/20/2002	8/27/2002	7	752349	761108	8759	1251	85.0
8/27/2002	37495	761108	8/27/2002	9/10/2002	14	761108	778513	17405	1243	86.9

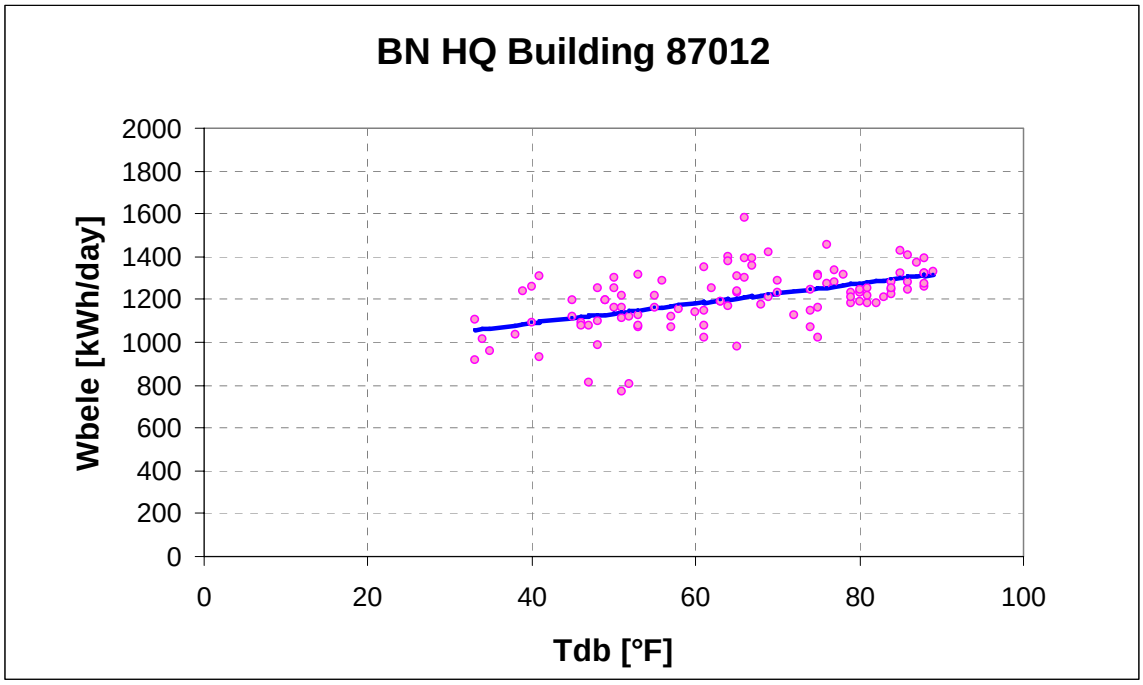
9/10/2002	37509	778513	9/10/2002	9/18/2002	8	778513	787980	9467	1183	82.4
9/18/2002	37517	787980	9/18/2002	9/24/2002	6	787980	795120	7140	1190	80.4
9/24/2002	37523	795120	9/24/2002	10/18/2002	24	795120	822162	27042	1127	72.6
10/18/2002	37547	822162	10/18/2002	1/0/1900	####	822162	0	-822162	22	71.8





12.2.10.2. Baseline Model From Manual Readings

```
87012
Path and name of input data file = 8700BLCKbldg1.prn
Value of no-data flag = -99
Column number of group field = 10
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 2
Column number of dependent Y variable =1
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 5
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg1.prn
    Model type =           2P
    Grouping column No =   10
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   5
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    105
          R2 =     0.276
       AdjR2 =     0.276
        RMSE =    119.1709
     CV-RMSE =     9.912%
           p =     0.397
          DW =     1.195 (p>0)
           a =    900.2824 (     49.6210)
          X1 =      4.6539 (      0.7434)
```


BN HQ Building 87012
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

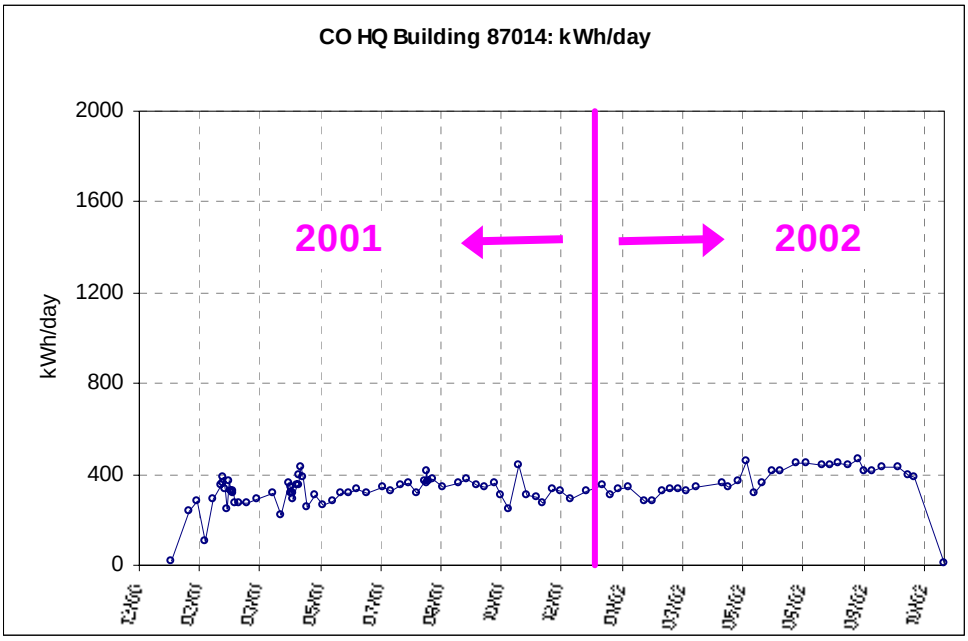
12.2.11. 87014 CO HQ Building

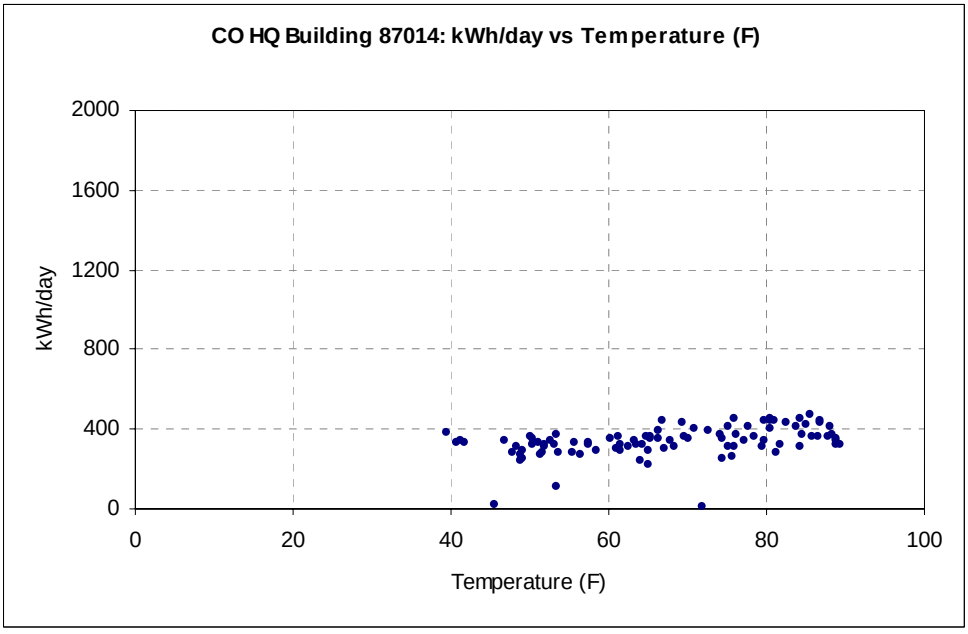
12.2.11.1. Electricity Use From Manual Readings

87014		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/26/2000	36886		12/26/2000	12/27/2000	1					33.7
12/27/2000	36887		12/27/2000	12/28/2000	1					35.2
12/28/2000	36888		12/28/2000	12/29/2000	1					38.6
12/29/2000	36889		12/29/2000	1/2/2001	4					34.3
1/2/2001	36893		1/2/2001	1/3/2001	1					33.1
1/3/2001	36894		1/3/2001	1/4/2001	1					40.7
1/4/2001	36895		1/4/2001	1/5/2001	1					46.4
1/5/2001	36896		1/5/2001	1/9/2001	4					47.2
1/9/2001	36900		1/9/2001	1/16/2001	7					45.1
1/16/2001	36907	3059	1/16/2001	1/30/2001	14	3059	3336	277	20	45.6
1/30/2001	36921	3336	1/30/2001	2/6/2001	7	3336	5003	1667	238	49.0
2/6/2001	36928	5003	2/6/2001	2/13/2001	7	5003	6972	1969	281	53.6
2/13/2001	36935	6972	2/13/2001	2/20/2001	7	6972	7731	759	108	53.5
2/20/2001	36942	7731	2/20/2001	2/26/2001	6	7731	9459	1728	288	58.5
2/26/2001	36948	9459	2/26/2001	2/27/2001	1	9459	9812	353	353	60.2
2/27/2001	36949	9812	2/27/2001	2/28/2001	1	9812	10171	359	359	50.1
2/28/2001	36950	10171	2/28/2001	3/1/2001	1	10171	10557	386	386	39.6
3/1/2001	36951	10557	3/1/2001	3/2/2001	1	10557	10895	338	338	41.3
3/2/2001	36952	10895	3/2/2001	3/5/2001	3	10895	11646	751	250	49.0
3/5/2001	36955	11646	3/5/2001	3/6/2001	1	11646	12015	369	369	53.3
3/6/2001	36956	12015	3/6/2001	3/7/2001	1	12015	12337	322	322	53.2
3/7/2001	36957	12337	3/7/2001	3/8/2001	1	12337	12653	316	316	51.8
3/8/2001	36958	12653	3/8/2001	3/9/2001	1	12653	12978	325	325	50.4
3/9/2001	36959	12978	3/9/2001	3/13/2001	4	12978	14084	1106	277	55.4
3/13/2001	36963	14084	3/13/2001	3/20/2001	7	14084	16016	1932	276	48.8
3/20/2001	36970	16016	3/20/2001	3/27/2001	7	16016	17921	1905	272	51.4
3/27/2001	36977	17921	3/27/2001	4/10/2001	14	17921	22023	4102	293	61.4
4/10/2001	36991	22023	4/10/2001	4/17/2001	7	22023	24216	2193	313	68.3
4/17/2001	36998	24216	4/17/2001	4/23/2001	6	24216	25526	1310	218	65.0
4/23/2001	37004	25526	4/23/2001	4/24/2001	1	25526	25888	362	362	61.3
4/24/2001	37005	25888	4/24/2001	4/25/2001	1	25888	26207	319	319	61.4
4/25/2001	37006	26207	4/25/2001	4/26/2001	1	26207	26553	346	346	63.2
4/26/2001	37007	26553	4/26/2001	4/27/2001	1	26553	26874	321	321	64.3
4/27/2001	37008	26874	4/27/2001	4/30/2001	3	26874	27745	871	290	65.1
4/30/2001	37011	27745	4/30/2001	5/1/2001	1	27745	28096	351	351	66.4
5/1/2001	37012	28096	5/1/2001	5/2/2001	1	28096	28450	354	354	70.1
5/2/2001	37013	28450	5/2/2001	5/3/2001	1	28450	28848	398	398	70.9
5/3/2001	37014	28848	5/3/2001	5/4/2001	1	28848	29284	436	436	69.3
5/4/2001	37015	29284	5/4/2001	5/8/2001	4	29284	30841	1557	389	66.4
5/8/2001	37019	30841	5/8/2001	5/15/2001	7	30841	32629	1788	255	74.4
5/15/2001	37026	32629	5/15/2001	5/22/2001	7	32629	34791	2162	309	75.9
5/22/2001	37033	34791	5/22/2001	5/29/2001	7	34791	36622	1831	262	75.6
5/29/2001	37040	36622	5/29/2001	6/5/2001	7	36622	38611	1989	284	81.2
6/5/2001	37047	38611	6/5/2001	6/12/2001	7	38611	40803	2192	313	79.6
6/12/2001	37054	40803	6/12/2001	6/19/2001	7	40803	43030	2227	318	81.7
6/19/2001	37061	43030	6/19/2001	6/26/2001	7	43030	45399	2369	338	79.7
6/26/2001	37068	45399	6/26/2001	7/10/2001	14	45399	49787	4388	313	84.4
7/10/2001	37082	49787	7/10/2001	7/17/2001	7	49787	52170	2383	340	88.9

7/17/2001	37089	52170	7/17/2001	7/24/2001	7	52170	54444	2274	325	89.4
7/24/2001	37096	54444	7/24/2001	7/31/2001	7	54444	56887	2443	349	88.8
7/31/2001	37103	56887	7/31/2001	8/7/2001	7	56887	59392	2505	358	87.8
8/7/2001	37110	59392	8/7/2001	8/13/2001	6	59392	61293	1901	317	88.9
8/13/2001	37116	61293	8/13/2001	8/15/2001	2	61293	62039	746	373	88.4
8/15/2001	37118	62039	8/15/2001	8/16/2001	1	62039	62451	412	412	88.0
8/16/2001	37119	62451	8/16/2001	8/17/2001	1	62451	62810	359	359	85.8
8/17/2001	37120	62810	8/17/2001	8/21/2001	4	62810	64276	1466	367	86.6
8/21/2001	37124	64276	8/21/2001	8/28/2001	7	64276	66910	2634	376	84.5
8/28/2001	37131	66910	8/28/2001	9/11/2001	14	66910	71665	4755	340	77.2
9/11/2001	37145	71665	9/11/2001	9/18/2001	7	71665	74216	2551	364	78.6
9/18/2001	37152	74216	9/18/2001	9/26/2001	8	74216	77231	3015	377	74.2
9/26/2001	37160	77231	9/26/2001	10/2/2001	6	77231	79340	2109	352	65.2
10/2/2001	37166	79340	10/2/2001	10/10/2001	8	79340	82112	2772	347	67.7
10/10/2001	37174	82112	10/10/2001	10/16/2001	6	82112	84299	2187	365	64.9
10/16/2001	37180	84299	10/16/2001	10/23/2001	7	84299	86437	2138	305	67.2
10/23/2001	37187	86437	10/23/2001	10/30/2001	7	86437	88151	1714	245	64.1
10/30/2001	37194	88151	10/30/2001	11/6/2001	7	88151	91244	3093	442	66.7
11/6/2001	37201	91244	11/6/2001	11/14/2001	8	91244	93702	2458	307	62.6
11/14/2001	37209	93702	11/14/2001	11/20/2001	6	93702	95525	1823	304	61.1
11/20/2001	37215	95525	11/20/2001	11/27/2001	7	95525	97456	1931	276	56.4
11/27/2001	37222	97456	11/27/2001	12/4/2001	7	97456	99810	2354	336	51.1
12/4/2001	37229	99810	12/4/2001	12/12/2001	8	99810	102421	2611	326	57.4
12/12/2001	37237	102421	12/12/2001	12/26/2001	14	102421	106550	4129	295	49.1
12/26/2001	37251	106550	12/26/2001	1/8/2002	13	106550	110800	4250	327	40.7
1/8/2002	37264	110800	1/8/2002	1/15/2002	7	110800	113260	2460	351	50.4
1/15/2002	37271	113260	1/15/2002	1/22/2002	7	113260	115433	2173	310	48.5
1/22/2002	37278	115433	1/22/2002	1/29/2002	7	115433	117786	2353	336	55.8
1/29/2002	37285	117786	1/29/2002	2/12/2002	14	117786	122638	4852	347	46.9
2/12/2002	37299	122638	2/12/2002	2/19/2002	7	122638	124586	1948	278	47.9
2/19/2002	37306	124586	2/19/2002	2/26/2002	7	124586	126583	1997	285	51.6
2/26/2002	37313	126583	2/26/2002	3/5/2002	7	126583	128865	2282	326	52.0
3/5/2002	37320	128865	3/5/2002	3/12/2002	7	128865	131212	2347	335	41.8
3/12/2002	37327	131212	3/12/2002	3/19/2002	7	131212	133556	2344	335	57.5
3/19/2002	37334	133556	3/19/2002	3/26/2002	7	133556	135839	2283	326	63.6
3/26/2002	37341	135839	3/26/2002	4/17/2002	22	135839	143363	7524	342	52.7
4/17/2002	37363	143363	4/17/2002	4/23/2002	6	143363	145526	2163	361	65.2
4/23/2002	37369	145526	4/23/2002	4/30/2002	7	145526	147957	2431	347	74.4
4/30/2002	37376	147957	4/30/2002	5/7/2002	7	147957	150525	2568	367	76.2
5/7/2002	37383	150525	5/7/2002	5/14/2002	7	150525	153721	3196	457	76.0
5/14/2002	37390	153721	5/14/2002	5/21/2002	7	153721	155937	2216	317	75.2
5/21/2002	37397	155937	5/21/2002	5/28/2002	7	155937	158461	2524	361	69.5
5/28/2002	37404	158461	5/28/2002	6/4/2002	7	158461	161332	2871	410	75.1
6/4/2002	37411	161332	6/4/2002	6/18/2002	14	161332	167125	5793	414	77.7
6/18/2002	37425	167125	6/18/2002	6/26/2002	8	167125	170702	3577	447	81.1
6/26/2002	37433	170702	6/26/2002	7/9/2002	13	170702	176517	5815	447	80.6
7/9/2002	37446	176517	7/9/2002	7/16/2002	7	176517	179584	3067	438	79.7
7/16/2002	37453	179584	7/16/2002	7/23/2002	7	179584	182668	3084	441	80.4
7/23/2002	37460	182668	7/23/2002	7/31/2002	8	182668	186250	3582	448	84.3
7/31/2002	37468	186250	7/31/2002	8/8/2002	8	186250	189805	3555	444	87.0
8/8/2002	37476	189805	8/8/2002	8/13/2002	5	189805	192143	2338	468	85.6
8/13/2002	37481	192143	8/13/2002	8/20/2002	7	192143	195044	2901	414	83.7
8/20/2002	37488	195044	8/20/2002	8/27/2002	7	195044	197973	2929	418	85.0
8/27/2002	37495	197973	8/27/2002	9/10/2002	14	197973	204009	6036	431	86.9

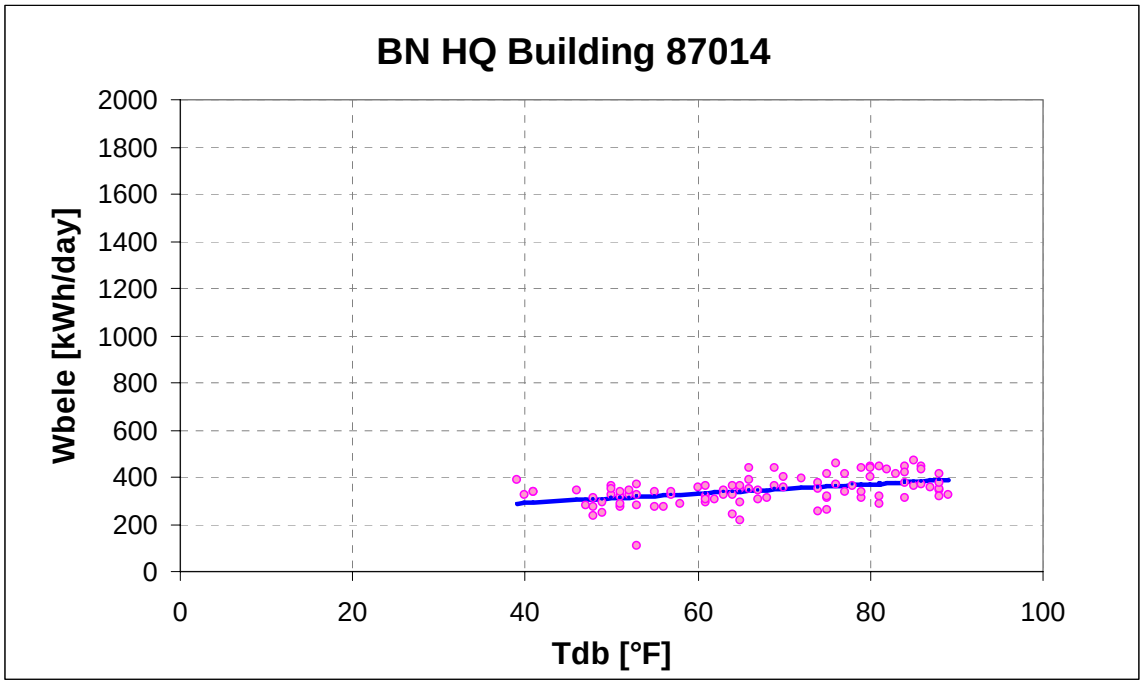
9/10/2002	37509	204009	9/10/2002	9/18/2002	8	204009	207441	3432	429	82.4
9/18/2002	37517	207441	9/18/2002	9/24/2002	6	207441	209835	2394	399	80.4
9/24/2002	37523	209835	9/24/2002	10/18/2002	24	209835	219234	9399	392	72.6
10/18/2002	37547	219234	10/18/2002	1/0/1900	####	219234	0	-219234	6	71.8





12.2.11.2. Baseline Model From Manual Readings

```
87014
Path and name of input data file = 8700BLCKbldg2_.prn
Value of no-data flag = -99
Column number of group field = 12
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 2
Column number of dependent Y variable =9
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 11
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg2_.prn
    Model type =           2P
    Grouping column No =   12
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      9
    X1 column number =  11
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     95
          R2 =     0.222
       AdjR2 =     0.222
        RMSE =     53.5411
     CV-RMSE =    15.580%
           p =     0.427
          DW =     1.137 (p>0)
           a =    207.1109 (     27.0994)
          X1 =      2.0226 (      0.3931)
```


BN HQ Building 87014
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

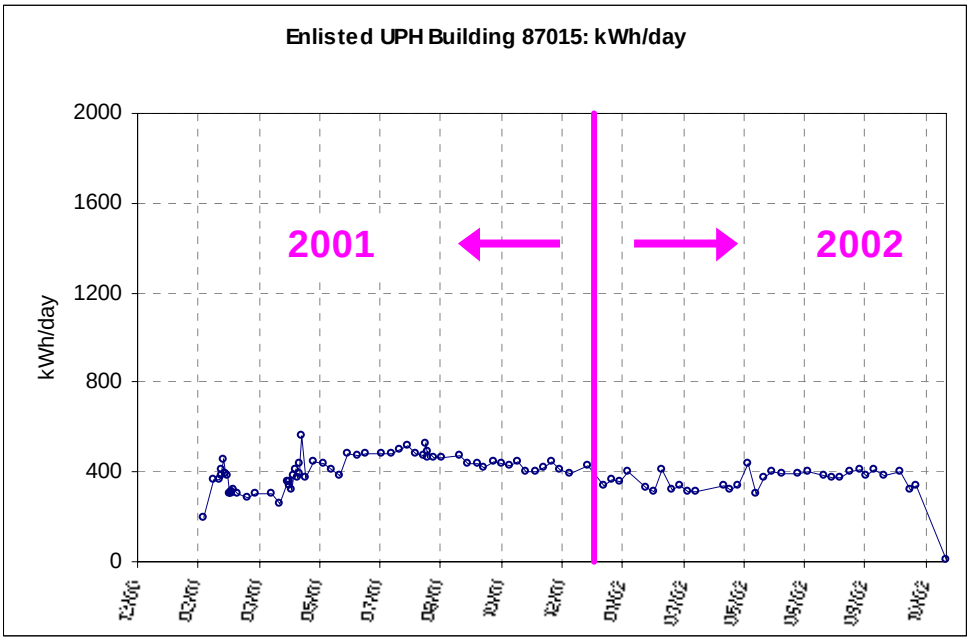
12.2.12. 87015 Enlisted UPH Building

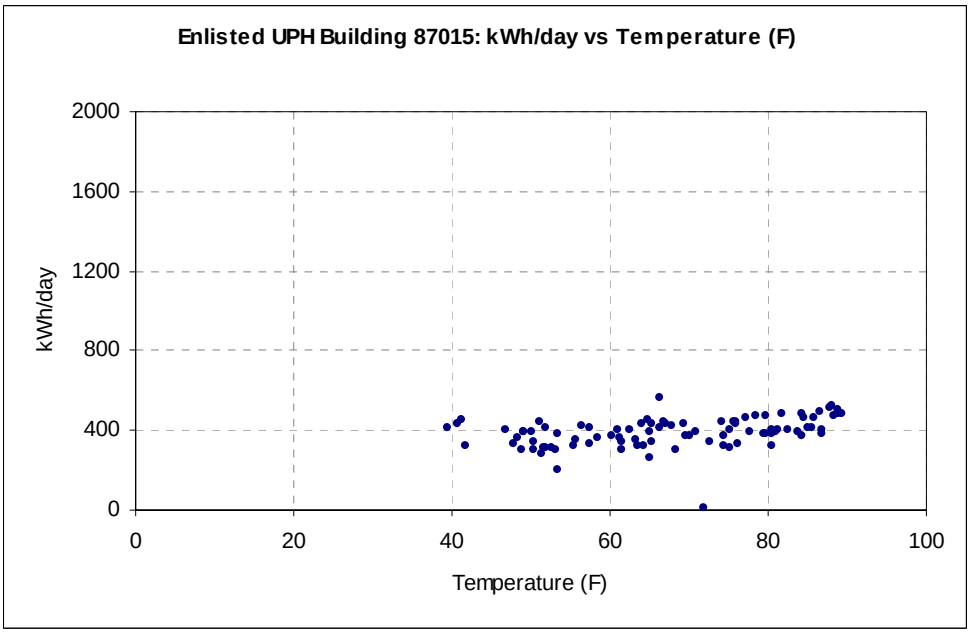
12.2.12.1. Electricity Use From Manual Readings

87015		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/26/2000	36886		12/26/2000	12/27/2000	1					33.7
12/27/2000	36887		12/27/2000	12/28/2000	1					35.2
12/28/2000	36888		12/28/2000	12/29/2000	1					38.6
12/29/2000	36889		12/29/2000	1/2/2001	4					34.3
1/2/2001	36893		1/2/2001	1/3/2001	1					33.1
1/3/2001	36894		1/3/2001	1/4/2001	1					40.7
1/4/2001	36895		1/4/2001	1/5/2001	1					46.4
1/5/2001	36896		1/5/2001	1/9/2001	4					47.2
1/9/2001	36900		1/9/2001	1/16/2001	7					45.1
1/16/2001	36907		1/16/2001	1/30/2001	14					45.6
1/30/2001	36921		1/30/2001	2/6/2001	7					49.0
2/6/2001	36928	6492	2/6/2001	2/13/2001	7					53.6
2/13/2001	36935	13177	2/13/2001	2/20/2001	7	13177	14578	1401	200	53.5
2/20/2001	36942	14578	2/20/2001	2/26/2001	6	14578	16755	2177	363	58.5
2/26/2001	36948	16755	2/26/2001	2/27/2001	1	16755	17122	367	367	60.2
2/27/2001	36949	17122	2/27/2001	2/28/2001	1	17122	17509	387	387	50.1
2/28/2001	36950	17509	2/28/2001	3/1/2001	1	17509	17919	410	410	39.6
3/1/2001	36951	17919	3/1/2001	3/2/2001	1	17919	18370	451	451	41.3
3/2/2001	36952	18370	3/2/2001	3/5/2001	3	18370	19544	1174	391	49.0
3/5/2001	36955	19544	3/5/2001	3/6/2001	1	19544	19929	385	385	53.3
3/6/2001	36956	19929	3/6/2001	3/7/2001	1	19929	20233	304	304	53.2
3/7/2001	36957	20233	3/7/2001	3/8/2001	1	20233	20549	316	316	51.8
3/8/2001	36958	20549	3/8/2001	3/9/2001	1	20549	20851	302	302	50.4
3/9/2001	36959	20851	3/9/2001	3/13/2001	4	20851	22138	1287	322	55.4
3/13/2001	36963	22138	3/13/2001	3/20/2001	7	22138	24260	2122	303	48.8
3/20/2001	36970	24260	3/20/2001	3/27/2001	7	24260	26264	2004	286	51.4
3/27/2001	36977	26264	3/27/2001	4/10/2001	14	26264	30533	4269	305	61.4
4/10/2001	36991	30533	4/10/2001	4/17/2001	7	30533	32652	2119	303	68.3
4/17/2001	36998	32652	4/17/2001	4/23/2001	6	32652	34219	1567	261	65.0
4/23/2001	37004	34219	4/23/2001	4/24/2001	1	34219	34579	360	360	61.3
4/24/2001	37005	34579	4/24/2001	4/25/2001	1	34579	34920	341	341	61.4
4/25/2001	37006	34920	4/25/2001	4/26/2001	1	34920	35275	355	355	63.2
4/26/2001	37007	35275	4/26/2001	4/27/2001	1	35275	35599	324	324	64.3
4/27/2001	37008	35599	4/27/2001	4/30/2001	3	35599	36760	1161	387	65.1
4/30/2001	37011	36760	4/30/2001	5/1/2001	1	36760	37173	413	413	66.4
5/1/2001	37012	37173	5/1/2001	5/2/2001	1	37173	37547	374	374	70.1
5/2/2001	37013	37547	5/2/2001	5/3/2001	1	37547	37940	393	393	70.9
5/3/2001	37014	37940	5/3/2001	5/4/2001	1	37940	38375	435	435	69.3
5/4/2001	37015	38375	5/4/2001	5/8/2001	4	38375	40608	2233	558	66.4
5/8/2001	37019	40608	5/8/2001	5/15/2001	7	40608	43226	2618	374	74.4
5/15/2001	37026	43226	5/15/2001	5/22/2001	7	43226	46347	3121	446	75.9
5/22/2001	37033	46347	5/22/2001	5/29/2001	7	46347	49439	3092	442	75.6
5/29/2001	37040	49439	5/29/2001	6/5/2001	7	49439	52283	2844	406	81.2
6/5/2001	37047	52283	6/5/2001	6/12/2001	7	52283	54973	2690	384	79.6
6/12/2001	37054	54973	6/12/2001	6/19/2001	7	54973	58355	3382	483	81.7
6/19/2001	37061	58355	6/19/2001	6/26/2001	7	58355	61664	3309	473	79.7
6/26/2001	37068	61664	6/26/2001	7/10/2001	14	61664	68445	6781	484	84.4
7/10/2001	37082	68445	7/10/2001	7/17/2001	7	68445	71817	3372	482	88.9

7/17/2001	37089	71817	7/17/2001	7/24/2001	7	71817	75173	3356	479	89.4
7/24/2001	37096	75173	7/24/2001	7/31/2001	7	75173	78671	3498	500	88.8
7/31/2001	37103	78671	7/31/2001	8/7/2001	7	78671	82277	3606	515	87.8
8/7/2001	37110	82277	8/7/2001	8/13/2001	6	82277	85156	2879	480	88.9
8/13/2001	37116	85156	8/13/2001	8/15/2001	2	85156	86094	938	469	88.4
8/15/2001	37118	86094	8/15/2001	8/16/2001	1	86094	86617	523	523	88.0
8/16/2001	37119	86617	8/16/2001	8/17/2001	1	86617	87084	467	467	85.8
8/17/2001	37120	87084	8/17/2001	8/21/2001	4	87084	89036	1952	488	86.6
8/21/2001	37124	89036	8/21/2001	8/28/2001	7	89036	92264	3228	461	84.5
8/28/2001	37131	92264	8/28/2001	9/11/2001	14	92264	98717	6453	461	77.2
9/11/2001	37145	98717	9/11/2001	9/18/2001	7	98717	102000	3283	469	78.6
9/18/2001	37152	102000	9/18/2001	9/26/2001	8	102000	105507	3507	438	74.2
9/26/2001	37160	105507	9/26/2001	10/2/2001	6	105507	108129	2622	437	65.2
10/2/2001	37166	108129	10/2/2001	10/10/2001	8	108129	111471	3342	418	67.7
10/10/2001	37174	111471	10/10/2001	10/16/2001	6	111471	114165	2694	449	64.9
10/16/2001	37180	114165	10/16/2001	10/23/2001	7	114165	117208	3043	435	67.2
10/23/2001	37187	117208	10/23/2001	10/30/2001	7	117208	120201	2993	428	64.1
10/30/2001	37194	120201	10/30/2001	11/6/2001	7	120201	123314	3113	445	66.7
11/6/2001	37201	123314	11/6/2001	11/14/2001	8	123314	126529	3215	402	62.6
11/14/2001	37209	126529	11/14/2001	11/20/2001	6	126529	128931	2402	400	61.1
11/20/2001	37215	128931	11/20/2001	11/27/2001	7	128931	131891	2960	423	56.4
11/27/2001	37222	131891	11/27/2001	12/4/2001	7	131891	134998	3107	444	51.1
12/4/2001	37229	134998	12/4/2001	12/12/2001	8	134998	138269	3271	409	57.4
12/12/2001	37237	138269	12/12/2001	12/26/2001	14	138269	143753	5484	392	49.1
12/26/2001	37251	143753	12/26/2001	1/8/2002	13	143753	149348	5595	430	40.7
1/8/2002	37264	149348	1/8/2002	1/15/2002	7	149348	151735	2387	341	50.4
1/15/2002	37271	151735	1/15/2002	1/22/2002	7	151735	154277	2542	363	48.5
1/22/2002	37278	154277	1/22/2002	1/29/2002	7	154277	156751	2474	353	55.8
1/29/2002	37285	156751	1/29/2002	2/12/2002	14	156751	162339	5588	399	46.9
2/12/2002	37299	162339	2/12/2002	2/19/2002	7	162339	164657	2318	331	47.9
2/19/2002	37306	164657	2/19/2002	2/26/2002	7	164657	166827	2170	310	51.6
2/26/2002	37313	166827	2/26/2002	3/5/2002	7	166827	169702	2875	411	52.0
3/5/2002	37320	169702	3/5/2002	3/12/2002	7	169702	171933	2231	319	41.8
3/12/2002	37327	171933	3/12/2002	3/19/2002	7	171933	174285	2352	336	57.5
3/19/2002	37334	174285	3/19/2002	3/26/2002	7	174285	176502	2217	317	63.6
3/26/2002	37341	176502	3/26/2002	4/17/2002	22	176502	183396	6894	313	52.7
4/17/2002	37363	183396	4/17/2002	4/23/2002	6	183396	185429	2033	339	65.2
4/23/2002	37369	185429	4/23/2002	4/30/2002	7	185429	187669	2240	320	74.4
4/30/2002	37376	187669	4/30/2002	5/7/2002	7	187669	190022	2353	336	76.2
5/7/2002	37383	190022	5/7/2002	5/14/2002	7	190022	193062	3040	434	76.0
5/14/2002	37390	193062	5/14/2002	5/21/2002	7	193062	195214	2152	307	75.2
5/21/2002	37397	195214	5/21/2002	5/28/2002	7	195214	197829	2615	374	69.5
5/28/2002	37404	197829	5/28/2002	6/4/2002	7	197829	200651	2822	403	75.1
6/4/2002	37411	200651	6/4/2002	6/18/2002	14	200651	206198	5547	396	77.7
6/18/2002	37425	206198	6/18/2002	6/26/2002	8	206198	209339	3141	393	81.1
6/26/2002	37433	209339	6/26/2002	7/9/2002	13	209339	214590	5251	404	80.6
7/9/2002	37446	214590	7/9/2002	7/16/2002	7	214590	217252	2662	380	79.7
7/16/2002	37453	217252	7/16/2002	7/23/2002	7	217252	219904	2652	379	80.4
7/23/2002	37460	219904	7/23/2002	7/31/2002	8	219904	222914	3010	376	84.3
7/31/2002	37468	222914	7/31/2002	8/8/2002	8	222914	226160	3246	406	87.0
8/8/2002	37476	226160	8/8/2002	8/13/2002	5	226160	228227	2067	413	85.6
8/13/2002	37481	228227	8/13/2002	8/20/2002	7	228227	230941	2714	388	83.7
8/20/2002	37488	230941	8/20/2002	8/27/2002	7	230941	233824	2883	412	85.0
8/27/2002	37495	233824	8/27/2002	9/10/2002	14	233824	239213	5389	385	86.9

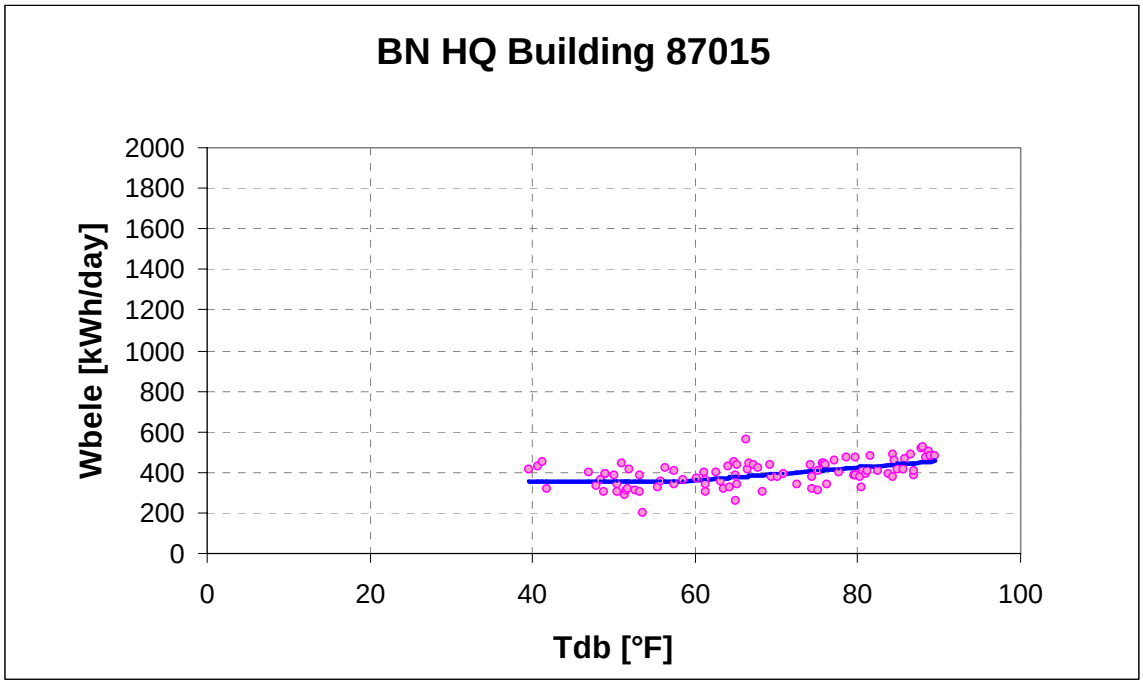
9/10/2002	37509	239213	9/10/2002	9/18/2002	8	239213	242462	3249	406	82.4
9/18/2002	37517	242462	9/18/2002	9/24/2002	6	242462	244415	1953	326	80.4
9/24/2002	37523	244415	9/24/2002	10/18/2002	24	244415	252545	8130	339	72.6
10/18/2002	37547	252545	10/18/2002	1/0/1900	####	252545	0	-252545	7	71.8





12.2.12.2. Baseline Model From Manual Readings

```
87015
Path and name of input data file = 8700BLCKbldg1.prn
Value of no-data flag = -99
Column number of group field = 10
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable =2
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 5
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg1.prn
    Model type =           3P Cooling
    Grouping column No =   10
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      2
    X1 column number =   5
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     93
          R2 =     0.284
       AdjR2 =     0.284
        RMSE =     54.5953
     CV-RMSE =    13.895%
           p =     0.546
          DW =     0.903 (p>0)
          N1 =     28
          N2 =     65
         Ycp =    357.1559 (      8.2183)
          LS =      0.0000 (      0.0000)
          RS =      3.2411 (      0.5400)
         Xcp =     59.5200 (      0.9970)
```


BN HQ Building 87015
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

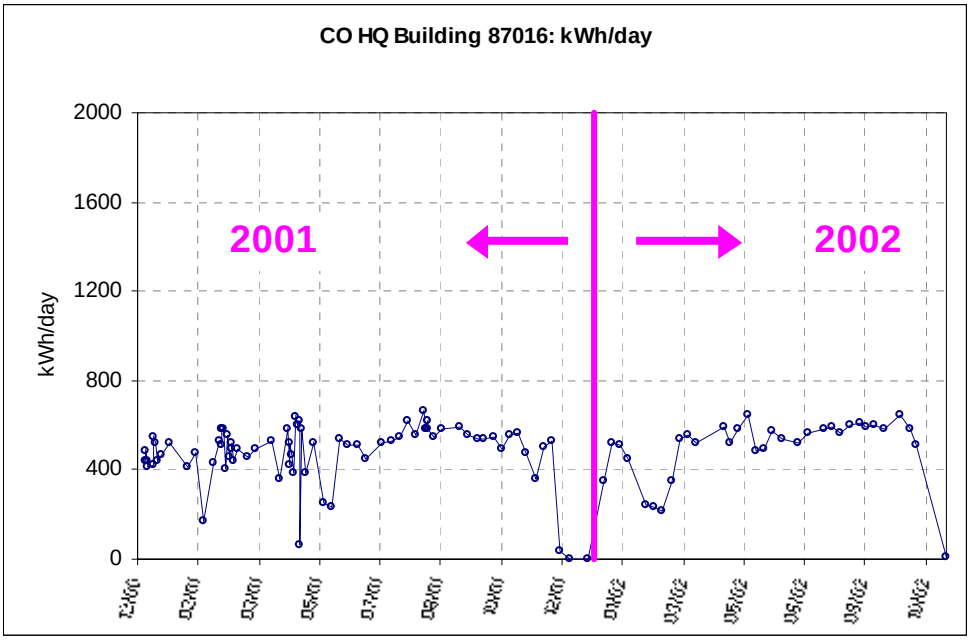
12.2.13. 87016 CO HQ Building

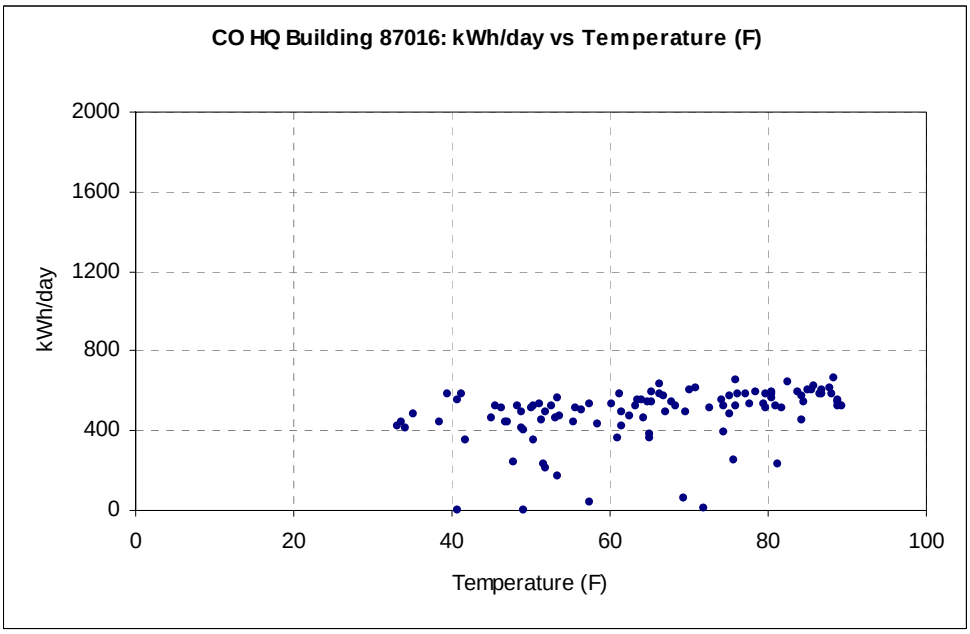
12.2.13.1. Electricity Use From Manual Readings

87016		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/26/2000	36886	12177	12/26/2000	12/27/2000	1	12177	12617	440	440	33.7
12/27/2000	36887	12617	12/27/2000	12/28/2000	1	12617	13102	485	485	35.2
12/28/2000	36888	13102	12/28/2000	12/29/2000	1	13102	13541	439	439	38.6
12/29/2000	36889	13541	12/29/2000	1/2/2001	4	13541	15178	1637	409	34.3
1/2/2001	36893	15178	1/2/2001	1/3/2001	1	15178	15600	422	422	33.1
1/3/2001	36894	15600	1/3/2001	1/4/2001	1	15600	16148	548	548	40.7
1/4/2001	36895	16148	1/4/2001	1/5/2001	1	16148	16664	516	516	46.4
1/5/2001	36896	16664	1/5/2001	1/9/2001	4	16664	18414	1750	438	47.2
1/9/2001	36900	18414	1/9/2001	1/16/2001	7	18414	21665	3251	464	45.1
1/16/2001	36907	21665	1/16/2001	1/30/2001	14	21665	29005	7340	524	45.6
1/30/2001	36921	29005	1/30/2001	2/6/2001	7	29005	31891	2886	412	49.0
2/6/2001	36928	31891	2/6/2001	2/13/2001	7	31891	35216	3325	475	53.6
2/13/2001	36935	35216	2/13/2001	2/20/2001	7	35216	36405	1189	170	53.5
2/20/2001	36942	36405	2/20/2001	2/26/2001	6	36405	38973	2568	428	58.5
2/26/2001	36948	38973	2/26/2001	2/27/2001	1	38973	39502	529	529	60.2
2/27/2001	36949	39502	2/27/2001	2/28/2001	1	39502	40014	512	512	50.1
2/28/2001	36950	40014	2/28/2001	3/1/2001	1	40014	40596	582	582	39.6
3/1/2001	36951	40596	3/1/2001	3/2/2001	1	40596	41175	579	579	41.3
3/2/2001	36952	41175	3/2/2001	3/5/2001	3	41175	42392	1217	406	49.0
3/5/2001	36955	42392	3/5/2001	3/6/2001	1	42392	42951	559	559	53.3
3/6/2001	36956	42951	3/6/2001	3/7/2001	1	42951	43410	459	459	53.2
3/7/2001	36957	43410	3/7/2001	3/8/2001	1	43410	43901	491	491	51.8
3/8/2001	36958	43901	3/8/2001	3/9/2001	1	43901	44424	523	523	50.4
3/9/2001	36959	44424	3/9/2001	3/13/2001	4	44424	46195	1771	443	55.4
3/13/2001	36963	46195	3/13/2001	3/20/2001	7	46195	49622	3427	490	48.8
3/20/2001	36970	49622	3/20/2001	3/27/2001	7	49622	52801	3179	454	51.4
3/27/2001	36977	52801	3/27/2001	4/10/2001	14	52801	59756	6955	497	61.4
4/10/2001	36991	59756	4/10/2001	4/17/2001	7	59756	63449	3693	528	68.3
4/17/2001	36998	63449	4/17/2001	4/23/2001	6	63449	65622	2173	362	65.0
4/23/2001	37004	65622	4/23/2001	4/24/2001	1	65622	66207	585	585	61.3
4/24/2001	37005	66207	4/24/2001	4/25/2001	1	66207	66633	426	426	61.4
4/25/2001	37006	66633	4/25/2001	4/26/2001	1	66633	67152	519	519	63.2
4/26/2001	37007	67152	4/26/2001	4/27/2001	1	67152	67619	467	467	64.3
4/27/2001	37008	67619	4/27/2001	4/30/2001	3	67619	68776	1157	386	65.1
4/30/2001	37011	68776	4/30/2001	5/1/2001	1	68776	69409	633	633	66.4
5/1/2001	37012	69409	5/1/2001	5/2/2001	1	69409	70012	603	603	70.1
5/2/2001	37013	70012	5/2/2001	5/3/2001	1	70012	70629	617	617	70.9
5/3/2001	37014	70629	5/3/2001	5/4/2001	1	70629	70689	60	60	69.3
5/4/2001	37015	70689	5/4/2001	5/8/2001	4	70689	73009	2320	580	66.4
5/8/2001	37019	73009	5/8/2001	5/15/2001	7	73009	75739	2730	390	74.4
5/15/2001	37026	75739	5/15/2001	5/22/2001	7	75739	79377	3638	520	75.9
5/22/2001	37033	79377	5/22/2001	5/29/2001	7	79377	81145	1768	253	75.6
5/29/2001	37040	81145	5/29/2001	6/5/2001	7	81145	82790	1645	235	81.2
6/5/2001	37047	82790	6/5/2001	6/12/2001	7	82790	86537	3747	535	79.6
6/12/2001	37054	86537	6/12/2001	6/19/2001	7	86537	90112	3575	511	81.7
6/19/2001	37061	90112	6/19/2001	6/26/2001	7	90112	93689	3577	511	79.7
6/26/2001	37068	93689	6/26/2001	7/10/2001	14	93689	99964	6275	448	84.4

7/10/2001	37082	99964	7/10/2001	7/17/2001	7	99964	103631	3667	524	88.9
7/17/2001	37089	103631	7/17/2001	7/24/2001	7	103631	107323	3692	527	89.4
7/24/2001	37096	107323	7/24/2001	7/31/2001	7	107323	111128	3805	544	88.8
7/31/2001	37103	111128	7/31/2001	8/7/2001	7	111128	115453	4325	618	87.8
8/7/2001	37110	115453	8/7/2001	8/13/2001	6	115453	118784	3331	555	88.9
8/13/2001	37116	118784	8/13/2001	8/15/2001	2	118784	120113	1329	665	88.4
8/15/2001	37118	120113	8/15/2001	8/16/2001	1	120113	120700	587	587	88.0
8/16/2001	37119	120700	8/16/2001	8/17/2001	1	120700	121323	623	623	85.8
8/17/2001	37120	121323	8/17/2001	8/21/2001	4	121323	123659	2336	584	86.6
8/21/2001	37124	123659	8/21/2001	8/28/2001	7	123659	127480	3821	546	84.5
8/28/2001	37131	127480	8/28/2001	9/11/2001	14	127480	135603	8123	580	77.2
9/11/2001	37145	135603	9/11/2001	9/18/2001	7	135603	139738	4135	591	78.6
9/18/2001	37152	139738	9/18/2001	9/26/2001	8	139738	144154	4416	552	74.2
9/26/2001	37160	144154	9/26/2001	10/2/2001	6	144154	147390	3236	539	65.2
10/2/2001	37166	147390	10/2/2001	10/10/2001	8	147390	151729	4339	542	67.7
10/10/2001	37174	151729	10/10/2001	10/16/2001	6	151729	154985	3256	543	64.9
10/16/2001	37180	154985	10/16/2001	10/23/2001	7	154985	158417	3432	490	67.2
10/23/2001	37187	158417	10/23/2001	10/30/2001	7	158417	162281	3864	552	64.1
10/30/2001	37194	162281	10/30/2001	11/6/2001	7	162281	166262	3981	569	66.7
11/6/2001	37201	166262	11/6/2001	11/14/2001	8	166262	170060	3798	475	62.6
11/14/2001	37209	170060	11/14/2001	11/20/2001	6	170060	172209	2149	358	61.1
11/20/2001	37215	172209	11/20/2001	11/27/2001	7	172209	175729	3520	503	56.4
11/27/2001	37222	175729	11/27/2001	12/4/2001	7	175729	179427	3698	528	51.1
12/4/2001	37229	179427	12/4/2001	12/12/2001	8	179427	179724	297	37	57.4
12/12/2001	37237	179724	12/12/2001	12/26/2001	14	179724	179724	0	0	49.1
12/26/2001	37251	179724	12/26/2001	1/8/2002	13	179724	179724	0	0	40.7
1/8/2002	37264	179724	1/8/2002	1/15/2002	7	179724	182169	2445	349	50.4
1/15/2002	37271	182169	1/15/2002	1/22/2002	7	182169	185811	3642	520	48.5
1/22/2002	37278	185811	1/22/2002	1/29/2002	7	185811	189376	3565	509	55.8
1/29/2002	37285	189376	1/29/2002	2/12/2002	14	189376	195596	6220	444	46.9
2/12/2002	37299	195596	2/12/2002	2/19/2002	7	195596	197302	1706	244	47.9
2/19/2002	37306	197302	2/19/2002	2/26/2002	7	197302	198918	1616	231	51.6
2/26/2002	37313	198918	2/26/2002	3/5/2002	7	198918	200411	1493	213	52.0
3/5/2002	37320	200411	3/5/2002	3/12/2002	7	200411	202861	2450	350	41.8
3/12/2002	37327	202861	3/12/2002	3/19/2002	7	202861	206600	3739	534	57.5
3/19/2002	37334	206600	3/19/2002	3/26/2002	7	206600	210470	3870	553	63.6
3/26/2002	37341	210470	3/26/2002	4/17/2002	22	210470	221972	11502	523	52.7
4/17/2002	37363	221972	4/17/2002	4/23/2002	6	221972	225523	3551	592	65.2
4/23/2002	37369	225523	4/23/2002	4/30/2002	7	225523	229162	3639	520	74.4
4/30/2002	37376	229162	4/30/2002	5/7/2002	7	229162	233236	4074	582	76.2
5/7/2002	37383	233236	5/7/2002	5/14/2002	7	233236	237786	4550	650	76.0
5/14/2002	37390	237786	5/14/2002	5/21/2002	7	237786	241147	3361	480	75.2
5/21/2002	37397	241147	5/21/2002	5/28/2002	7	241147	244613	3466	495	69.5
5/28/2002	37404	244613	5/28/2002	6/4/2002	7	244613	248644	4031	576	75.1
6/4/2002	37411	248644	6/4/2002	6/18/2002	14	248644	256129	7485	535	77.7
6/18/2002	37425	256129	6/18/2002	6/26/2002	8	256129	260294	4165	521	81.1
6/26/2002	37433	260294	6/26/2002	7/9/2002	13	260294	267597	7303	562	80.6
7/9/2002	37446	267597	7/9/2002	7/16/2002	7	267597	271648	4051	579	79.7
7/16/2002	37453	271648	7/16/2002	7/23/2002	7	271648	275802	4154	593	80.4
7/23/2002	37460	275802	7/23/2002	7/31/2002	8	275802	280355	4553	569	84.3
7/31/2002	37468	280355	7/31/2002	8/8/2002	8	280355	285155	4800	600	87.0
8/8/2002	37476	285155	8/8/2002	8/13/2002	5	285155	288189	3034	607	85.6
8/13/2002	37481	288189	8/13/2002	8/20/2002	7	288189	292338	4149	593	83.7
8/20/2002	37488	292338	8/20/2002	8/27/2002	7	292338	296549	4211	602	85.0

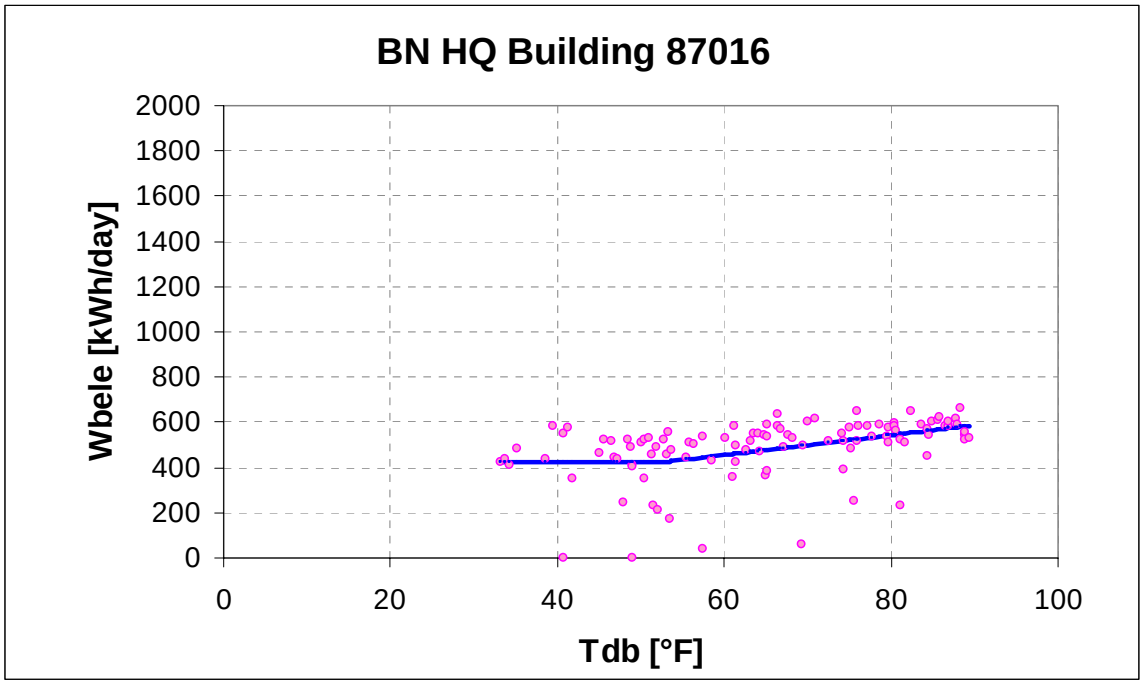
8/27/2002	37495	296549	8/27/2002	9/10/2002	14	296549	304748	8199	586	86.9
9/10/2002	37509	304748	9/10/2002	9/18/2002	8	304748	309920	5172	647	82.4
9/18/2002	37517	309920	9/18/2002	9/24/2002	6	309920	313427	3507	585	80.4
9/24/2002	37523	313427	9/24/2002	10/18/2002	24	313427	325767	12340	514	72.6
10/18/2002	37547	325767	10/18/2002	1/0/1900	####	325767	0	-325767	9	71.8





12.2.13.2. Baseline Model From Manual Readings

```
87016
Path and name of input data file = 8700BLCKbldg1.prn
Value of no-data flag = -99
Column number of group field = 10
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable =3
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 5
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg1.prn
    Model type =           3P Cooling
    Grouping column No =   10
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      3
    X1 column number =   5
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =    105
          R2 =     0.183
       AdjR2 =     0.183
        RMSE =    121.6514
     CV-RMSE =    25.071%
           p =     0.352
          DW =     1.296 (p>0)
          N1 =     29
          N2 =     76
         Ycp =    421.2564 (     17.8477)
          LS =      0.0000 (      0.0000)
          RS =      4.3916 (      0.9148)
         Xcp =     52.2720 (      1.1260)
   --------------------------------
```


BN HQ Building 87016
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

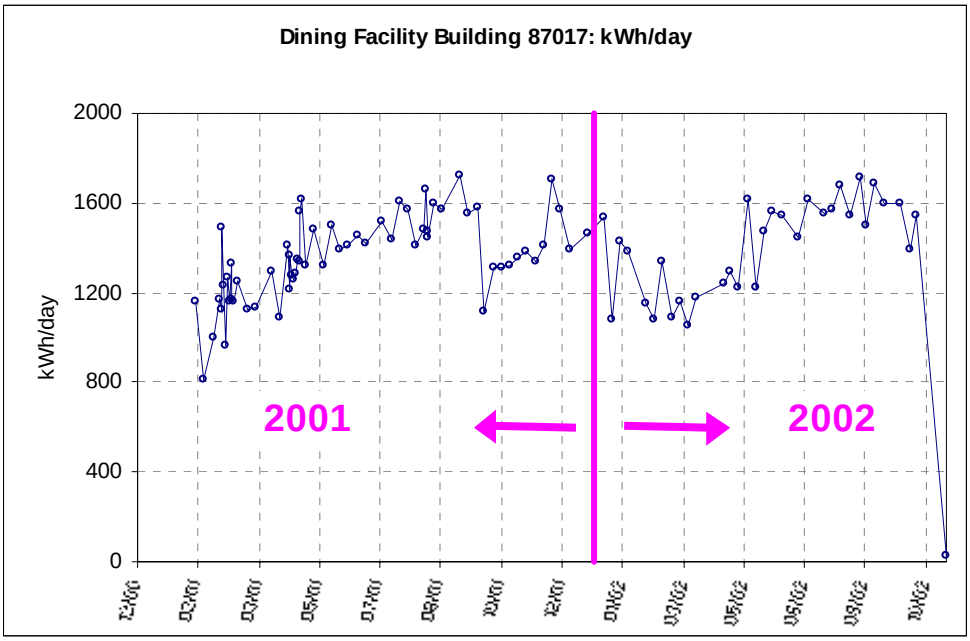
12.2.14. 87017 Dining Facility

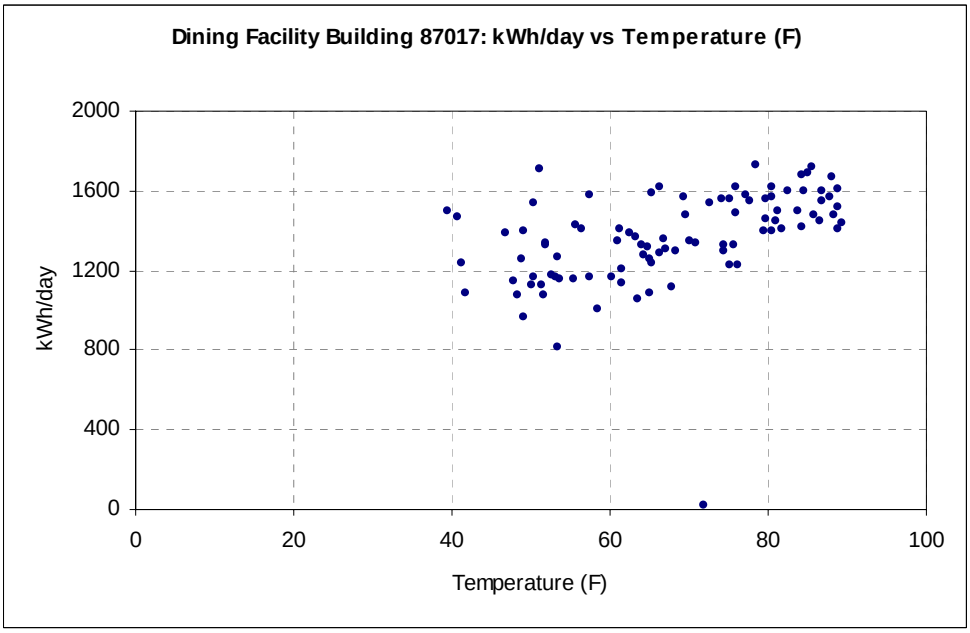
12.2.14.1. Electricity Use From Manual Readings

87017		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/26/2000	36886		12/26/2000	12/27/2000	1					33.7
12/27/2000	36887		12/27/2000	12/28/2000	1					35.2
12/28/2000	36888		12/28/2000	12/29/2000	1					38.6
12/29/2000	36889		12/29/2000	1/2/2001	4					34.3
1/2/2001	36893		1/2/2001	1/3/2001	1					33.1
1/3/2001	36894		1/3/2001	1/4/2001	1					40.7
1/4/2001	36895		1/4/2001	1/5/2001	1					46.4
1/5/2001	36896		1/5/2001	1/9/2001	4					47.2
1/9/2001	36900		1/9/2001	1/16/2001	7					45.1
1/16/2001	36907		1/16/2001	1/30/2001	14					45.6
1/30/2001	36921		1/30/2001	2/6/2001	7					49.0
2/6/2001	36928	6185	2/6/2001	2/13/2001	7	6185	14301	8116	1159	53.6
2/13/2001	36935	14301	2/13/2001	2/20/2001	7	14301	19969	5668	810	53.5
2/20/2001	36942	19969	2/20/2001	2/26/2001	6	19969	25977	6008	1001	58.5
2/26/2001	36948	25977	2/26/2001	2/27/2001	1	25977	27145	1168	1168	60.2
2/27/2001	36949	27145	2/27/2001	2/28/2001	1	27145	28266	1121	1121	50.1
2/28/2001	36950	28266	2/28/2001	3/1/2001	1	28266	29761	1495	1495	39.6
3/1/2001	36951	29761	3/1/2001	3/2/2001	1	29761	30996	1235	1235	41.3
3/2/2001	36952	30996	3/2/2001	3/5/2001	3	30996	33876	2880	960	49.0
3/5/2001	36955	33876	3/5/2001	3/6/2001	1	33876	35141	1265	1265	53.3
3/6/2001	36956	35141	3/6/2001	3/7/2001	1	35141	36306	1165	1165	53.2
3/7/2001	36957	36306	3/7/2001	3/8/2001	1	36306	37636	1330	1330	51.8
3/8/2001	36958	37636	3/8/2001	3/9/2001	1	37636	38803	1167	1167	50.4
3/9/2001	36959	38803	3/9/2001	3/13/2001	4	38803	43438	4635	1159	55.4
3/13/2001	36963	43438	3/13/2001	3/20/2001	7	43438	52208	8770	1253	48.8
3/20/2001	36970	52208	3/20/2001	3/27/2001	7	52208	60096	7888	1127	51.4
3/27/2001	36977	60096	3/27/2001	4/10/2001	14	60096	76015	15919	1137	61.4
4/10/2001	36991	76015	4/10/2001	4/17/2001	7	76015	85061	9046	1292	68.3
4/17/2001	36998	85061	4/17/2001	4/23/2001	6	85061	91572	6511	1085	65.0
4/23/2001	37004	91572	4/23/2001	4/24/2001	1	91572	92983	1411	1411	61.3
4/24/2001	37005	92983	4/24/2001	4/25/2001	1	92983	94194	1211	1211	61.4
4/25/2001	37006	94194	4/25/2001	4/26/2001	1	94194	95559	1365	1365	63.2
4/26/2001	37007	95559	4/26/2001	4/27/2001	1	95559	96835	1276	1276	64.3
4/27/2001	37008	96835	4/27/2001	4/30/2001	3	96835	100606	3771	1257	65.1
4/30/2001	37011	100606	4/30/2001	5/1/2001	1	100606	101892	1286	1286	66.4
5/1/2001	37012	101892	5/1/2001	5/2/2001	1	101892	103242	1350	1350	70.1
5/2/2001	37013	103242	5/2/2001	5/3/2001	1	103242	104582	1340	1340	70.9
5/3/2001	37014	104582	5/3/2001	5/4/2001	1	104582	106147	1565	1565	69.3
5/4/2001	37015	106147	5/4/2001	5/8/2001	4	106147	112607	6460	1615	66.4
5/8/2001	37019	112607	5/8/2001	5/15/2001	7	112607	121864	9257	1322	74.4
5/15/2001	37026	121864	5/15/2001	5/22/2001	7	121864	132260	10396	1485	75.9
5/22/2001	37033	132260	5/22/2001	5/29/2001	7	132260	141531	9271	1324	75.6
5/29/2001	37040	141531	5/29/2001	6/5/2001	7	141531	152013	10482	1497	81.2
6/5/2001	37047	152013	6/5/2001	6/12/2001	7	152013	161762	9749	1393	79.6
6/12/2001	37054	161762	6/12/2001	6/19/2001	7	161762	171621	9859	1408	81.7
6/19/2001	37061	171621	6/19/2001	6/26/2001	7	171621	181789	10168	1453	79.7
6/26/2001	37068	181789	6/26/2001	7/10/2001	14	181789	201606	19817	1416	84.4
7/10/2001	37082	201606	7/10/2001	7/17/2001	7	201606	212228	10622	1517	88.9

7/17/2001	37089	212228	7/17/2001	7/24/2001	7	212228	222265	10037	1434	89.4
7/24/2001	37096	222265	7/24/2001	7/31/2001	7	222265	233506	11241	1606	88.8
7/31/2001	37103	233506	7/31/2001	8/7/2001	7	233506	244479	10973	1568	87.8
8/7/2001	37110	244479	8/7/2001	8/13/2001	6	244479	252927	8448	1408	88.9
8/13/2001	37116	252927	8/13/2001	8/15/2001	2	252927	255884	2957	1479	88.4
8/15/2001	37118	255884	8/15/2001	8/16/2001	1	255884	257549	1665	1665	88.0
8/16/2001	37119	257549	8/16/2001	8/17/2001	1	257549	259025	1476	1476	85.8
8/17/2001	37120	259025	8/17/2001	8/21/2001	4	259025	264813	5788	1447	86.6
8/21/2001	37124	264813	8/21/2001	8/28/2001	7	264813	276027	11214	1602	84.5
8/28/2001	37131	276027	8/28/2001	9/11/2001	14	276027	298069	22042	1574	77.2
9/11/2001	37145	298069	9/11/2001	9/18/2001	7	298069	310143	12074	1725	78.6
9/18/2001	37152	310143	9/18/2001	9/26/2001	8	310143	322593	12450	1556	74.2
9/26/2001	37160	322593	9/26/2001	10/2/2001	6	322593	332096	9503	1584	65.2
10/2/2001	37166	332096	10/2/2001	10/10/2001	8	332096	341019	8923	1115	67.7
10/10/2001	37174	341019	10/10/2001	10/16/2001	6	341019	348907	7888	1315	64.9
10/16/2001	37180	348907	10/16/2001	10/23/2001	7	348907	358072	9165	1309	67.2
10/23/2001	37187	358072	10/23/2001	10/30/2001	7	358072	367328	9256	1322	64.1
10/30/2001	37194	367328	10/30/2001	11/6/2001	7	367328	376811	9483	1355	66.7
11/6/2001	37201	376811	11/6/2001	11/14/2001	8	376811	387892	11081	1385	62.6
11/14/2001	37209	387892	11/14/2001	11/20/2001	6	387892	395947	8055	1343	61.1
11/20/2001	37215	395947	11/20/2001	11/27/2001	7	395947	405815	9868	1410	56.4
11/27/2001	37222	405815	11/27/2001	12/4/2001	7	405815	417780	11965	1709	51.1
12/4/2001	37229	417780	12/4/2001	12/12/2001	8	417780	430366	12586	1573	57.4
12/12/2001	37237	430366	12/12/2001	12/26/2001	14	430366	449879	19513	1394	49.1
12/26/2001	37251	449879	12/26/2001	1/8/2002	13	449879	468930	19051	1465	40.7
1/8/2002	37264	468930	1/8/2002	1/15/2002	7	468930	479695	10765	1538	50.4
1/15/2002	37271	479695	1/15/2002	1/22/2002	7	479695	487240	7545	1078	48.5
1/22/2002	37278	487240	1/22/2002	1/29/2002	7	487240	497234	9994	1428	55.8
1/29/2002	37285	497234	1/29/2002	2/12/2002	14	497234	516612	19378	1384	46.9
2/12/2002	37299	516612	2/12/2002	2/19/2002	7	516612	524662	8050	1150	47.9
2/19/2002	37306	524662	2/19/2002	2/26/2002	7	524662	532210	7548	1078	51.6
2/26/2002	37313	532210	2/26/2002	3/5/2002	7	532210	541561	9351	1336	52.0
3/5/2002	37320	541561	3/5/2002	3/12/2002	7	541561	549181	7620	1089	41.8
3/12/2002	37327	549181	3/12/2002	3/19/2002	7	549181	557335	8154	1165	57.5
3/19/2002	37334	557335	3/19/2002	3/26/2002	7	557335	564721	7386	1055	63.6
3/26/2002	37341	564721	3/26/2002	4/17/2002	22	564721	590650	25929	1179	52.7
4/17/2002	37363	590650	4/17/2002	4/23/2002	6	590650	598095	7445	1241	65.2
4/23/2002	37369	598095	4/23/2002	4/30/2002	7	598095	607186	9091	1299	74.4
4/30/2002	37376	607186	4/30/2002	5/7/2002	7	607186	615764	8578	1225	76.2
5/7/2002	37383	615764	5/7/2002	5/14/2002	7	615764	627103	11339	1620	76.0
5/14/2002	37390	627103	5/14/2002	5/21/2002	7	627103	635692	8589	1227	75.2
5/21/2002	37397	635692	5/21/2002	5/28/2002	7	635692	646003	10311	1473	69.5
5/28/2002	37404	646003	5/28/2002	6/4/2002	7	646003	656918	10915	1559	75.1
6/4/2002	37411	656918	6/4/2002	6/18/2002	14	656918	678595	21677	1548	77.7
6/18/2002	37425	678595	6/18/2002	6/26/2002	8	678595	690142	11547	1443	81.1
6/26/2002	37433	690142	6/26/2002	7/9/2002	13	690142	711201	21059	1620	80.6
7/9/2002	37446	711201	7/9/2002	7/16/2002	7	711201	722090	10889	1556	79.7
7/16/2002	37453	722090	7/16/2002	7/23/2002	7	722090	733062	10972	1567	80.4
7/23/2002	37460	733062	7/23/2002	7/31/2002	8	733062	746509	13447	1681	84.3
7/31/2002	37468	746509	7/31/2002	8/8/2002	8	746509	758852	12343	1543	87.0
8/8/2002	37476	758852	8/8/2002	8/13/2002	5	758852	767434	8582	1716	85.6
8/13/2002	37481	767434	8/13/2002	8/20/2002	7	767434	777908	10474	1496	83.7
8/20/2002	37488	777908	8/20/2002	8/27/2002	7	777908	789733	11825	1689	85.0
8/27/2002	37495	789733	8/27/2002	9/10/2002	14	789733	812145	22412	1601	86.9

9/10/2002	37509	812145	9/10/2002	9/18/2002	8	812145	824913	12768	1596	82.4
9/18/2002	37517	824913	9/18/2002	9/24/2002	6	824913	833285	8372	1395	80.4
9/24/2002	37523	833285	9/24/2002	10/18/2002	24	833285	870263	36978	1541	72.6
10/18/2002	37547	870263	10/18/2002	1/0/1900	####	870263	0	-870263	23	71.8

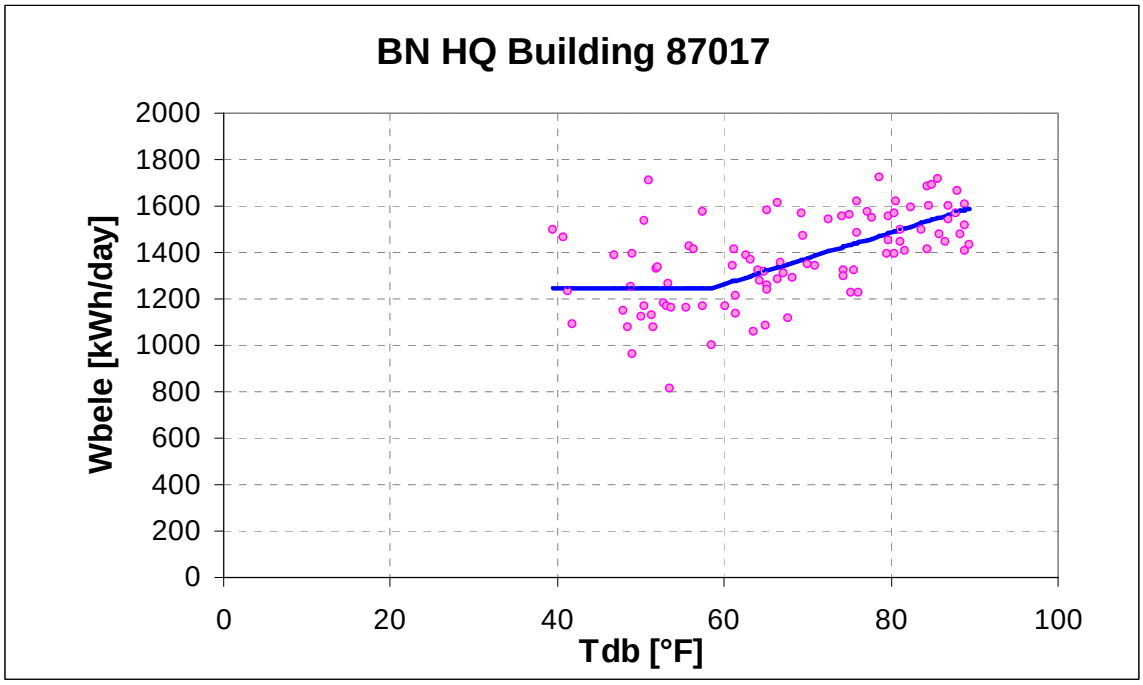




12.2.14.2. Baseline Model From Manual Readings

Path and name of input data file = 8700BLCKbldg1.prn
Value of no-data flag = -99
Column number of group field = 10
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable =4
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 5
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg1.prn
    Model type =           3P Cooling
    Grouping column No =   10
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      4
    X1 column number =   5
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     94
          R2 =     0.385
       AdjR2 =     0.385
        RMSE =    152.6291
     CV-RMSE =    11.091%
           p =     0.255
          DW =     1.480 (p>0)
          N1 =     28
          N2 =     66
         Ycp =   1247.9343 (     23.0908)
          LS =      0.0000 (      0.0000)
          RS =     11.0479 (      1.4558)
         Xcp =     58.5230 (      0.9970)
```

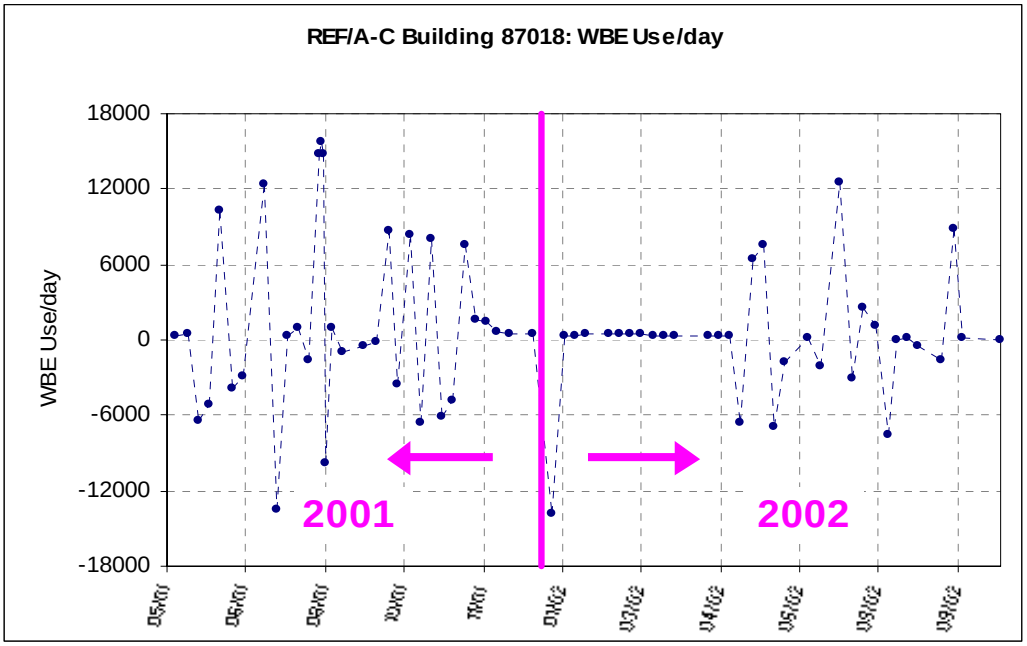

BN HQ Building 87017
Wbele [kWh/day]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

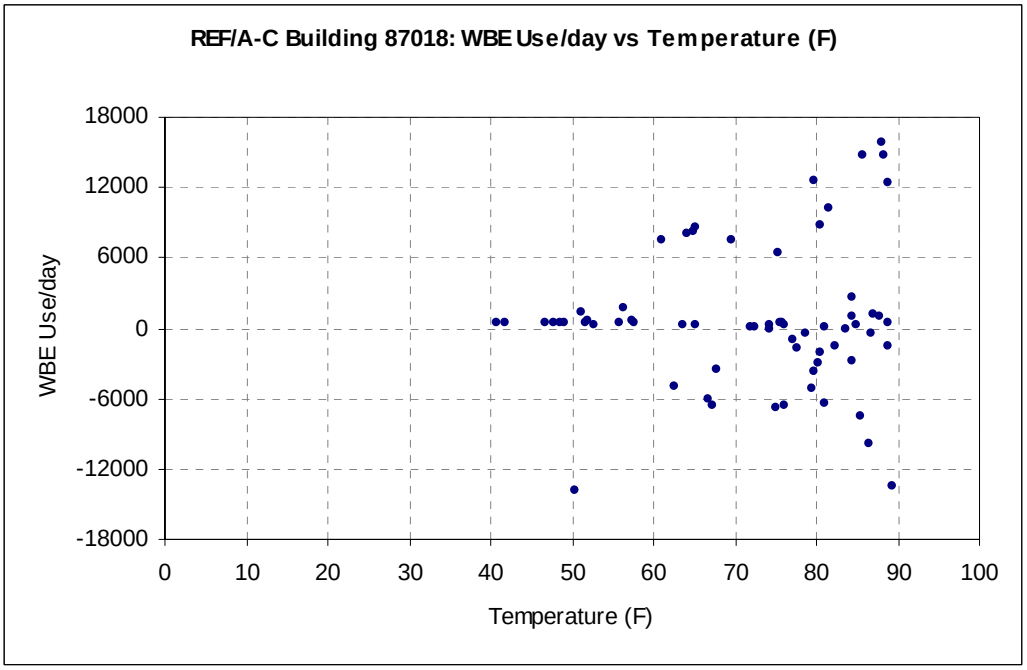
12.2.15. 87018 Electricity Use

12.2.15.1. Electricity Use From Manual Readings

87018 WBE		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
5/15/2001	37026	82760	5/15/2001	5/22/2001	7	82760	85299	2539	363	75.9
5/22/2001	37033	85299	5/22/2001	5/29/2001	7	85299	88601	3302	472	75.6
5/29/2001	37040	88601	5/29/2001	6/5/2001	7	88601	43872	-44729	-6390	81.2
6/5/2001	37047	43872	6/5/2001	6/12/2001	7	43872	8197	-35675	-5096	79.6
6/12/2001	37054	8197	6/12/2001	6/19/2001	7	8197	79964	71767	10252	81.7
6/19/2001	37061	79964	6/19/2001	6/26/2001	7	79964	53464	-26500	-3786	79.7
6/26/2001	37068	53464	6/26/2001	7/10/2001	14	53464	13264	-40200	-2871	84.4
7/10/2001	37082	13264	7/10/2001	7/17/2001	7	13264	99884	86620	12374	88.9
7/17/2001	37089	99884	7/17/2001	7/24/2001	7	99884	5225	-94659	-13523	89.4
7/24/2001	37096	5225	7/24/2001	7/31/2001	7	5225	7867	2642	377	88.8
7/31/2001	37103	7867	7/31/2001	8/7/2001	7	7867	14591	6724	961	87.8
8/7/2001	37110	14591	8/7/2001	8/13/2001	6	14591	5159	-9432	-1572	88.9
8/13/2001	37116	5159	8/13/2001	8/15/2001	2	5159	34584	29425	14713	88.4
8/15/2001	37118	34584	8/15/2001	8/16/2001	1	34584	50405	15821	15821	88.0
8/16/2001	37119	50405	8/16/2001	8/17/2001	1	50405	65186	14781	14781	85.8
8/17/2001	37120	65186	8/17/2001	8/21/2001	4	65186	25716	-39470	-9868	86.6
8/21/2001	37124	25716	8/21/2001	8/28/2001	7	25716	32157	6441	920	84.5
8/28/2001	37131	32157	8/28/2001	9/11/2001	14	32157	19135	-13022	-930	77.2
9/11/2001	37145	19135	9/11/2001	9/18/2001	7	19135	16181	-2954	-422	78.6
9/18/2001	37152	16181	9/18/2001	9/26/2001	8	16181	14796	-1385	-173	74.2
9/26/2001	37160	14796	9/26/2001	10/2/2001	6	14796	66488	51692	8615	65.2
10/2/2001	37166	66488	10/2/2001	10/10/2001	8	66488	37615	-28873	-3609	67.7
10/10/2001	37174	37615	10/10/2001	10/16/2001	6	37615	87492	49877	8313	64.9
10/16/2001	37180	87492	10/16/2001	10/23/2001	7	87492	41063	-46429	-6633	67.2
10/23/2001	37187	41063	10/23/2001	10/30/2001	7	41063	97264	56201	8029	64.1
10/30/2001	37194	97264	10/30/2001	11/6/2001	7	97264	54288	-42976	-6139	66.7
11/6/2001	37201	54288	11/6/2001	11/14/2001	8	54288	15140	-39148	-4894	62.6
11/14/2001	37209	15140	11/14/2001	11/20/2001	6	15140	60030	44890	7482	61.1
11/20/2001	37215	60030	11/20/2001	11/27/2001	7	60030	71538	11508	1644	56.4
11/27/2001	37222	71538	11/27/2001	12/4/2001	7	71538	81417	9879	1411	51.1
12/4/2001	37229	81417	12/4/2001	12/12/2001	8	81417	85952	4535	567	57.4
12/12/2001	37237	85952	12/12/2001	12/26/2001	14	85952	92885	6933	495	49.1
12/26/2001	37251	92885	12/26/2001	1/8/2002	13	92885	99443	6558	504	40.7
1/8/2002	37264	99443	1/8/2002	1/15/2002	7	99443	2622	-96821	-13832	50.4
1/15/2002	37271	2622	1/15/2002	1/22/2002	7	2622	5386	2764	395	48.5
1/22/2002	37278	5386	1/22/2002	1/29/2002	7	5386	8014	2628	375	55.8
1/29/2002	37285	8014	1/29/2002	2/12/2002	14	8014	14546	6532	467	46.9
2/12/2002	37299	14546	2/12/2002	2/19/2002	7	14546	17512	2966	424	47.9
2/19/2002	37306	17512	2/19/2002	2/26/2002	7	17512	20847	3335	476	51.6
2/26/2002	37313	20847	2/26/2002	3/5/2002	7	20847	24683	3836	548	52.0
3/5/2002	37320	24683	3/5/2002	3/12/2002	7	24683	27631	2948	421	41.8
3/12/2002	37327	27631	3/12/2002	3/19/2002	7	27631	30189	2558	365	57.5
3/19/2002	37334	30189	3/19/2002	3/26/2002	7	30189	32379	2190	313	63.6
3/26/2002	37341	32379	3/26/2002	4/17/2002	22	32379	40035	7656	348	52.7
4/17/2002	37363	40035	4/17/2002	4/23/2002	6	40035	42016	1981	330	65.2
4/23/2002	37369	42016	4/23/2002	4/30/2002	7	42016	44075	2059	294	74.4
4/30/2002	37376	44075	4/30/2002	5/7/2002	7	44075	46071	1996	285	76.2
5/7/2002	37383	46071	5/7/2002	5/14/2002	7	46071	436	-45635	-6519	76.0

5/14/2002	37390	436	5/14/2002	5/21/2002	7	436	45561	45125	6446	75.2
5/21/2002	37397	45561	5/21/2002	5/28/2002	7	45561	98731	53170	7596	69.5
5/28/2002	37404	98731	5/28/2002	6/4/2002	7	98731	50848	-47883	-6840	75.1
6/4/2002	37411	50848	6/4/2002	6/18/2002	14	50848	27017	-23831	-1702	77.7
6/18/2002	37425	27017	6/18/2002	6/26/2002	8	27017	28279	1262	158	81.1
6/26/2002	37433	28279	6/26/2002	7/9/2002	13	28279	743	-27536	-2118	80.6
7/9/2002	37446	743	7/9/2002	7/16/2002	7	743	88335	87592	12513	79.7
7/16/2002	37453	88335	7/16/2002	7/23/2002	7	88335	67233	-21102	-3015	80.4
7/23/2002	37460	67233	7/23/2002	7/31/2002	8	67233	88180	20947	2618	84.3
7/31/2002	37468	88180	7/31/2002	8/8/2002	8	88180	96912	8732	1092	87.0
8/8/2002	37476	96912	8/8/2002	8/13/2002	5	96912	58944	-37968	-7594	85.6
8/13/2002	37481	58944	8/13/2002	8/20/2002	7	58944	58565	-379	-54	83.7
8/20/2002	37488	58565	8/20/2002	8/27/2002	7	58565	60226	1661	237	85.0
8/27/2002	37495	60226	8/27/2002	9/10/2002	14	60226	53579	-6647	-475	86.9
9/10/2002	37509	53579	9/10/2002	9/18/2002	8	53579	41150	-12429	-1554	82.4
9/18/2002	37517	41150	9/18/2002	9/24/2002	6	41150	94033	52883	8814	80.4
9/24/2002	37523	94033	9/24/2002	10/18/2002	24	94033	96909	2876	120	72.6
10/18/2002	37547	96909	10/18/2002	1/0/1900	####	96909	0	-96909	3	71.8


REF/A-C Building 87018: WBE Use/day
WBE Use/day
18000
12000
6000
0
-6000
-12000
-18000
2001
2002

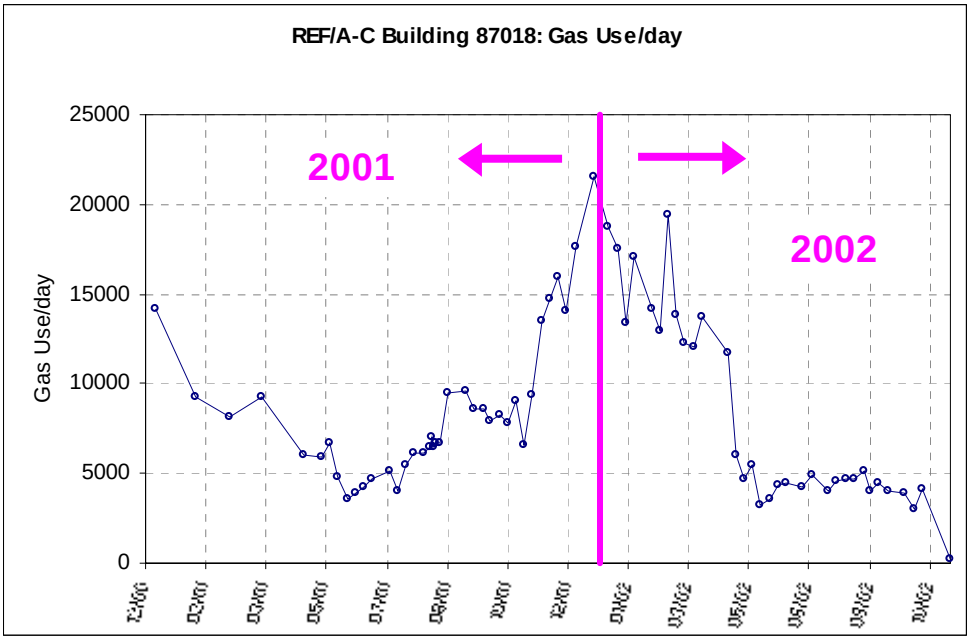

REF/A-C Building 87018: WBE Use/day vs Temperature (F)
WBE Use/day
18000
12000
6000
0
-6000
-12000
-18000
0
10
20
30
40
50
60
70
80
90
100
Temperature (F)

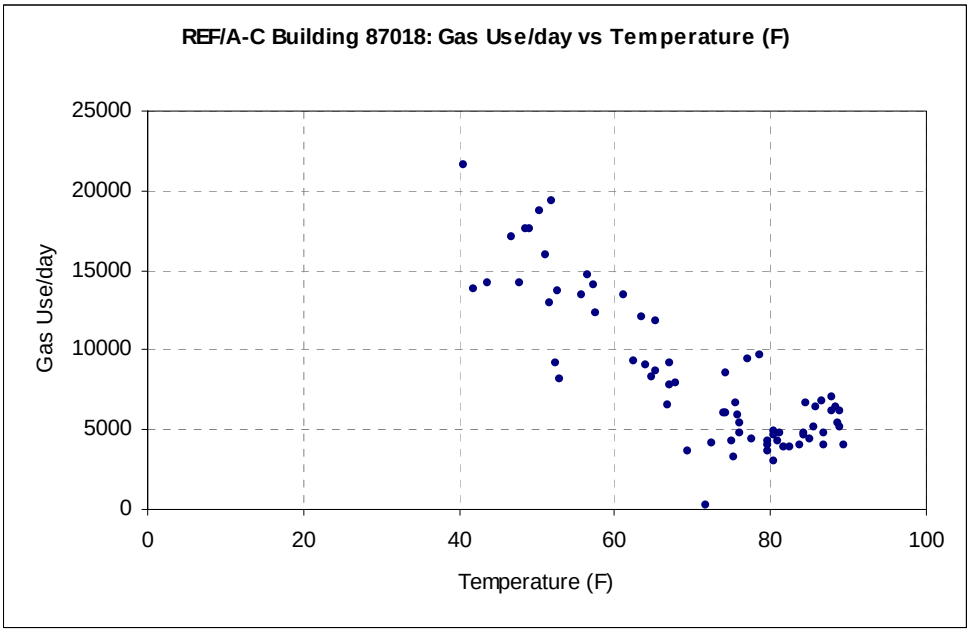
87018 Natural Gas Use

12.2.15.2. Natural Gas Use From Manual Readings

87018 NG		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
12/29/2000	36889	2057341	12/29/2000	1/30/2001	32	2057341	2511427	454086	14190	43.6
1/30/2001	36921	2511427	1/30/2001	2/28/2001	29	2511427	2778731	267304	9217	52.5
2/28/2001	36950	2778731	2/28/2001	3/27/2001	27	2778731	2999965	221234	8194	53.1
3/27/2001	36977	2999965	3/27/2001	4/30/2001	34	2999965	3313802	313837	9231	67.2
4/30/2001	37011	3222783	4/30/2001	5/15/2001	15	3222783	3313802	91019	6068	74.0
5/15/2001	37026	3313802	5/15/2001	5/22/2001	7	3313802	3355211	41409	5916	75.9
5/22/2001	37033	3355211	5/22/2001	5/29/2001	7	3355211	3401985	46774	6682	75.6
5/29/2001	37040	3401985	5/29/2001	6/5/2001	7	3401985	3435513	33528	4790	81.2
6/5/2001	37047	3435513	6/5/2001	6/12/2001	7	3435513	3460822	25309	3616	79.6
6/12/2001	37054	3460822	6/12/2001	6/19/2001	7	3460822	3488135	27313	3902	81.7
6/19/2001	37061	3488135	6/19/2001	6/26/2001	7	3488135	3518098	29963	4280	79.7
6/26/2001	37068	3518098	6/26/2001	7/10/2001	14	3518098	3583113	65015	4644	84.4
7/10/2001	37082	3583113	7/10/2001	7/17/2001	7	3583113	3619259	36146	5164	88.9
7/17/2001	37089	3619259	7/17/2001	7/24/2001	7	3619259	3647271	28012	4002	89.4
7/24/2001	37096	3647271	7/24/2001	7/31/2001	7	3647271	3685162	37891	5413	88.8
7/31/2001	37103	3685162	7/31/2001	8/7/2001	7	3685162	3728155	42993	6142	87.8
8/7/2001	37110	3728155	8/7/2001	8/13/2001	6	3728155	3765188	37033	6172	88.9
8/13/2001	37116	3765188	8/13/2001	8/15/2001	2	3765188	3778038	12850	6425	88.4
8/15/2001	37118	3778038	8/15/2001	8/16/2001	1	3778038	3785118	7080	7080	88.0
8/16/2001	37119	3785118	8/16/2001	8/17/2001	1	3785118	3791582	6464	6464	85.8
8/17/2001	37120	3791582	8/17/2001	8/21/2001	4	3791582	3818585	27003	6751	86.6
8/21/2001	37124	3818585	8/21/2001	8/28/2001	7	3818585	3865371	46786	6684	84.5
8/28/2001	37131	3865371	8/28/2001	9/11/2001	14	3865371	3997461	132090	9435	77.2
9/11/2001	37145	3997461	9/11/2001	9/18/2001	7	3997461	4064761	67300	9614	78.6
9/18/2001	37152	4064761	9/18/2001	9/26/2001	8	4064761	4133215	68454	8557	74.2
9/26/2001	37160	4133215	9/26/2001	10/2/2001	6	4133215	4184983	51768	8628	65.2
10/2/2001	37166	4184983	10/2/2001	10/10/2001	8	4184983	4248731	63748	7969	67.7
10/10/2001	37174	4248731	10/10/2001	10/16/2001	6	4248731	4298289	49558	8260	64.9
10/16/2001	37180	4298289	10/16/2001	10/23/2001	7	4298289	4352763	54474	7782	67.2
10/23/2001	37187	4352763	10/23/2001	10/30/2001	7	4352763	4416093	63330	9047	64.1
10/30/2001	37194	4416093	10/30/2001	11/6/2001	7	4416093	4461885	45792	6542	66.7
11/6/2001	37201	4461885	11/6/2001	11/14/2001	8	4461885	4536655	74770	9346	62.6
11/14/2001	37209	4536655	11/14/2001	11/20/2001	6	4536655	4617441	80786	13464	61.1
11/20/2001	37215	4617441	11/20/2001	11/27/2001	7	4617441	4720546	103105	14729	56.4
11/27/2001	37222	4720546	11/27/2001	12/4/2001	7	4720546	4831945	111399	15914	51.1
12/4/2001	37229	4831945	12/4/2001	12/12/2001	8	4831945	4944081	112136	14017	57.4
12/12/2001	37237	4944081	12/12/2001	12/26/2001	14	4944081	5190692	246611	17615	49.1
12/26/2001	37251	5190692	12/26/2001	1/8/2002	13	5190692	5471215	280523	21579	40.7
1/8/2002	37264	5471215	1/8/2002	1/15/2002	7	5471215	5602466	131251	18750	50.4
1/15/2002	37271	5602466	1/15/2002	1/22/2002	7	5602466	5725253	122787	17541	48.5
1/22/2002	37278	5725253	1/22/2002	1/29/2002	7	5725253	5819344	94091	13442	55.8
1/29/2002	37285	5819344	1/29/2002	2/12/2002	14	5819344	6058402	239058	17076	46.9
2/12/2002	37299	6058402	2/12/2002	2/19/2002	7	6058402	6157625	99223	14175	47.9
2/19/2002	37306	6157625	2/19/2002	2/26/2002	7	6157625	6248285	90660	12951	51.6
2/26/2002	37313	6248285	2/26/2002	3/5/2002	7	6248285	6383984	135699	19386	52.0
3/5/2002	37320	6383984	3/5/2002	3/12/2002	7	6383984	6481071	97087	13870	41.8
3/12/2002	37327	6481071	3/12/2002	3/19/2002	7	6481071	6567239	86168	12310	57.5
3/19/2002	37334	6567239	3/19/2002	3/26/2002	7	6567239	6651822	84583	12083	63.6

3/26/2002	37341	6651822	3/26/2002	4/17/2002	22	6651822	6952605	300783	13672	52.7
4/17/2002	37363	6952605	4/17/2002	4/23/2002	6	6952605	7023185	70580	11763	65.2
4/23/2002	37369	7023185	4/23/2002	4/30/2002	7	7023185	7065187	42002	6000	74.4
4/30/2002	37376	7065187	4/30/2002	5/7/2002	7	7065187	7098291	33104	4729	76.2
5/7/2002	37383	7098291	5/7/2002	5/14/2002	7	7098291	7136445	38154	5451	76.0
5/14/2002	37390	7136445	5/14/2002	5/21/2002	7	7136445	7159250	22805	3258	75.2
5/21/2002	37397	7159250	5/21/2002	5/28/2002	7	7159250	7184345	25095	3585	69.5
5/28/2002	37404	7184345	5/28/2002	6/4/2002	7	7184345	7214647	30302	4329	75.1
6/4/2002	37411	7214647	6/4/2002	6/18/2002	14	7214647	7276682	62035	4431	77.7
6/18/2002	37425	7276682	6/18/2002	6/26/2002	8	7276682	7310804	34122	4265	81.1
6/26/2002	37433	7310804	6/26/2002	7/9/2002	13	7310804	7374916	64112	4932	80.6
7/9/2002	37446	7374916	7/9/2002	7/16/2002	7	7374916	7403330	28414	4059	79.7
7/16/2002	37453	7403330	7/16/2002	7/23/2002	7	7403330	7435471	32141	4592	80.4
7/23/2002	37460	7435471	7/23/2002	7/31/2002	8	7435471	7473200	37729	4716	84.3
7/31/2002	37468	7473200	7/31/2002	8/8/2002	8	7473200	7510942	37742	4718	87.0
8/8/2002	37476	7510942	8/8/2002	8/13/2002	5	7510942	7536746	25804	5161	85.6
8/13/2002	37481	7536746	8/13/2002	8/20/2002	7	7536746	7564987	28241	4034	83.7
8/20/2002	37488	7564987	8/20/2002	8/27/2002	7	7564987	7595985	30998	4428	85.0
8/27/2002	37495	7595985	8/27/2002	9/10/2002	14	7595985	7652975	56990	4071	86.9
9/10/2002	37509	7652975	9/10/2002	9/18/2002	8	7652975	7684109	31134	3892	82.4
9/18/2002	37517	7684109	9/18/2002	9/24/2002	6	7684109	7702411	18302	3050	80.4
9/24/2002	37523	7702411	9/24/2002	10/18/2002	24	7702411	7801792	99381	4141	72.6
10/18/2002	37547	7801792	10/18/2002	1/0/1900	####	7801792	0	-8E+06	208	71.8


REF/A-C Building 87018: Gas Use/day
Gas Use/day
25000
20000
15000
10000
5000
0
2001
2002

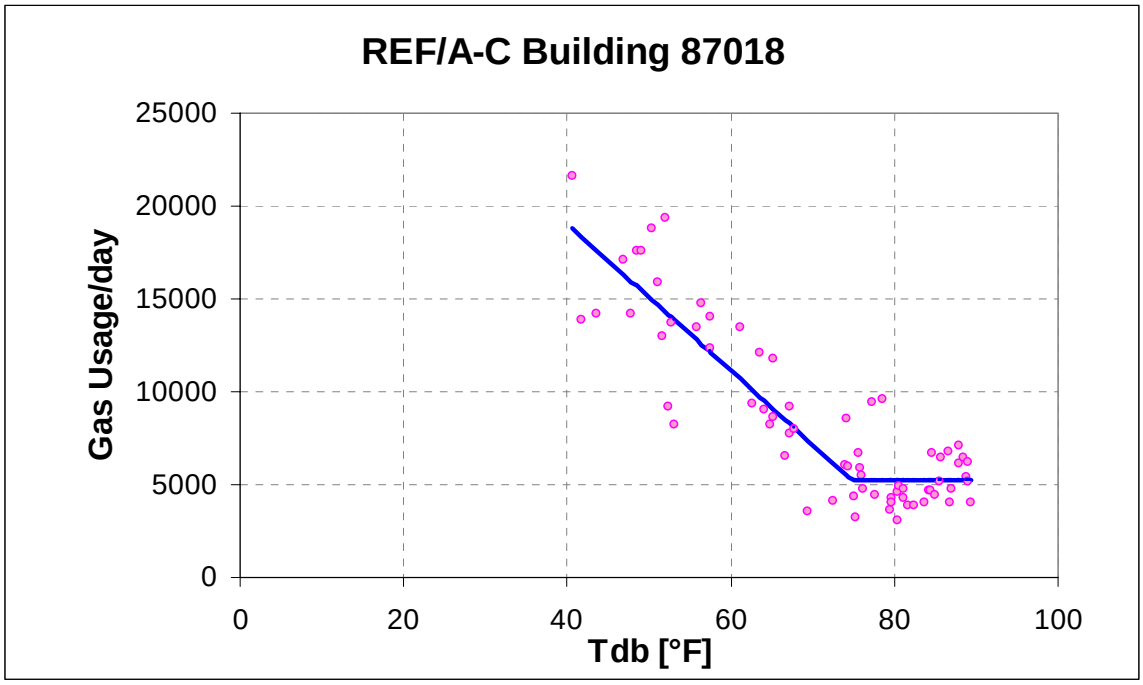

REF/A-C Building 87018: Gas Use/day vs Temperature (F)
Gas Use/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Temperature (F)

12.2.15.3. Baseline Model From Manual Readings

87018 NATURAL GAS

Path and name of input data file = 8700BLCKbldg1.prn
Value of no-data flag = -99
Column number of group field = 10
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable =8
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 9
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

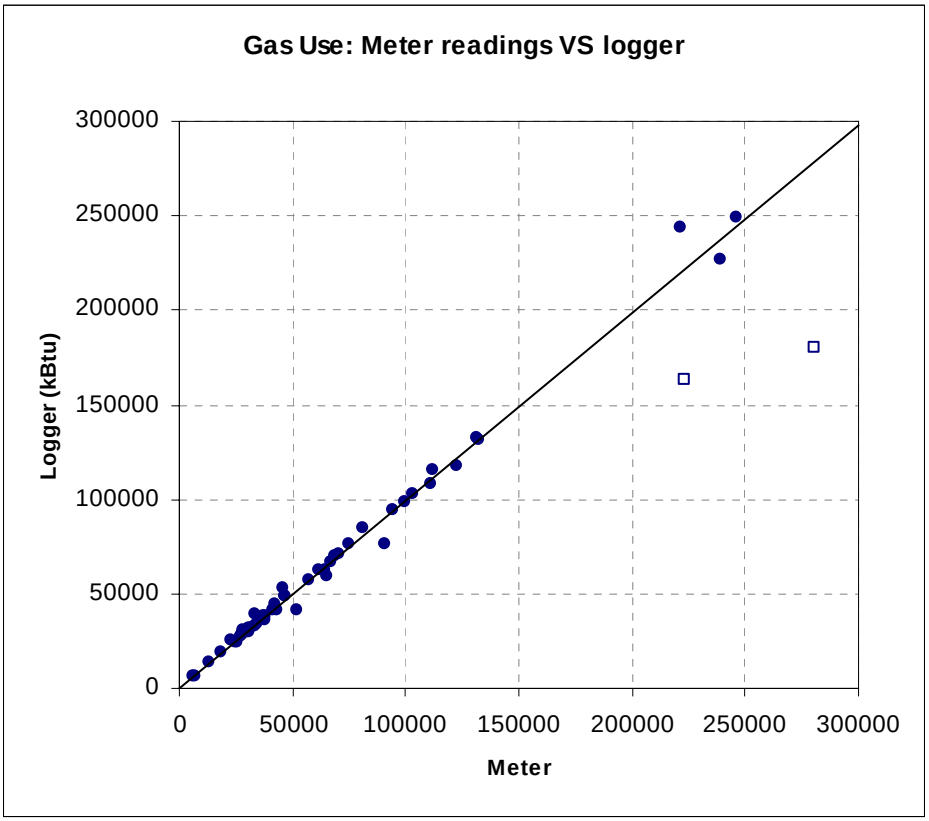
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  8700BLCKbldg1.prn
    Model type =           3P Heating
    Grouping column No =   10
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      8
    X1 column number =   9
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     70
          R2 =     0.806
       AdjR2 =     0.806
        RMSE =   2081.1140
     CV-RMSE =    24.759%
           p =     0.457
          DW =     1.069 (p>0)
          N1 =     34
          N2 =     36
         Ycp =   5272.6997 (    310.9408)
          LS =   -395.5360 (     23.5573)
          RS =      0.0000 (      0.0000)
         Xcp =     74.8050 (      0.9750)
   ---------------------------------
```


REF/A-C Building 87018
Gas Usage/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.2.16. 87018 Comparison of manual gas vs logger readings for the thermal plant

Date	WBE Reading	Gas Reading	Gas Use (Meter)	Gas Use (Logger) (kBtu??)
3/1/2001	-	2778731	-	-
3/27/2001	-	2999965	221234	243603
4/30/2001	-	3222783	222818	162806
5/15/2001	82760	3313802	91019	76202
5/22/2001	85299	3355211	41409	40904
5/29/2001	88601	3401985	46774	48238
6/5/2001		3435513	33528	39314
6/12/2001		3460822	25309	24822
6/19/2001		3488135	27313	27967
6/26/2001		3518098	29963	30166
7/10/2001		3583113	65015	59822
7/17/2001		3619259	36146	36462
7/24/2001		3647271	28012	28365
7/31/2001		3685162	37891	37554
8/7/2001		3728155	42993	41516
8/13/2001		3765188	37033	38433
8/15/2001		3778038	12850	13449
8/16/2001		3785118	7080	6596
8/17/2001		3791582	6464	6742
8/21/2001		3818585	27003	27175
8/28/2001		3865371	46786	48420
9/11/2001		3997461	132090	131922
9/18/2001		4064761	67300	66913
9/26/2001		4133215	68454	69707
10/2/2001		4184983	51768	41640
10/10/2001		4248731	63748	
10/16/2001		4298289	49558	
10/23/2001		4352763	54474	
10/30/2001		4416093	63330	
11/6/2001		4461885	45792	53283
11/14/2001		4536655	74770	76507
11/20/2001		4617441	80786	84287
11/27/2001		4720546	103105	103054
12/4/2001		4831945	111399	108626
12/12/2001		4944081	112136	115390
12/26/2001		5190692	246611	248760
1/8/2002		5471215	280523	179810
1/15/2002		5602466	131251	132278
1/22/2002		5725253	122787	117967
1/29/2002		5819344	94091	94165
2/12/2002		6058402	239058	227293
2/19/2002		6157625	99223	
2/26/2002		6248285	90660	
3/5/2002		6383984	135699	

3/12/2002		6481071	97087	
3/19/2002		6567239	86168	
3/26/2002		6651822	84583	
4/17/2002		6952605	300783	301116
4/23/2002		7023185	70580	70581
4/30/2002		7065187	42002	45042
5/7/2002		7098291	33104	32818
5/14/2002		7136445	38154	35963
5/21/2002		7159250	22805	25484
5/28/2002		7184345	25095	24449
6/4/2002		7214647	30302	30418
6/18/2002		7276682	62035	62129
6/26/2002		7310804	34122	34149
7/9/2002		7374916	64112	62073
7/16/2002		7403330	28414	30247
7/23/2002		7435471	32141	31901
7/31/2002		7473200	37729	37687
8/8/2002		7510942	37742	37665
8/13/2002		7536746	25804	24642
8/20/2002		7564987	28241	29308
8/27/2002		7595985	30998	29949
9/10/2002		7652975	56990	57553
9/18/2002		7684109	31134	31569
9/24/2002		7702411	18302	18638
10/18/2002		7801792	99381	98984



12.3. Additional buildings where manual readings are being made.

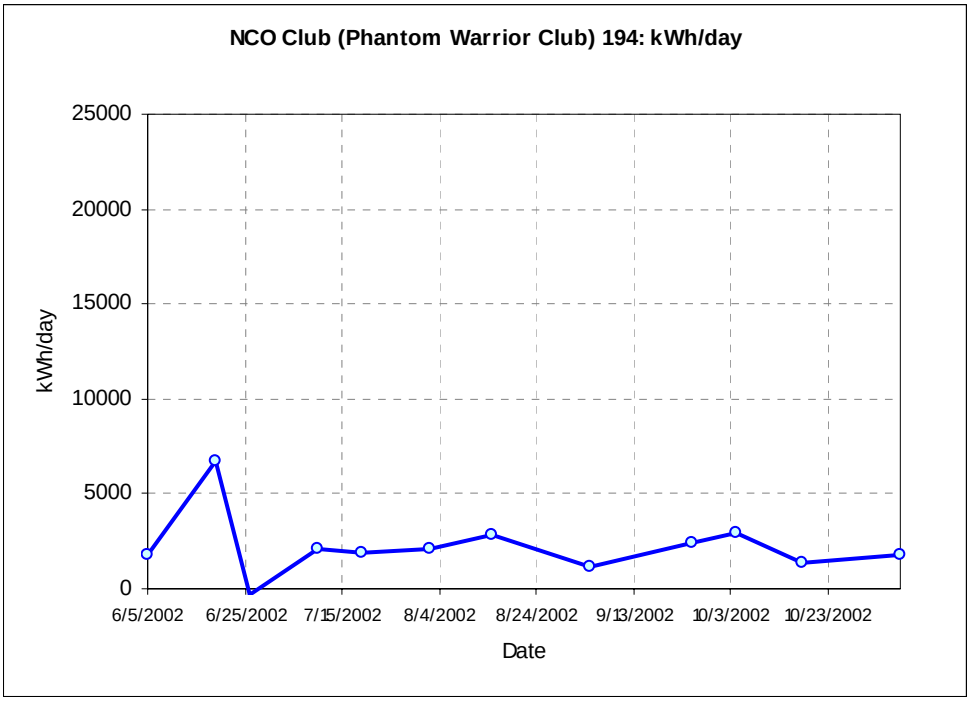
This section of the report contains preliminary models on the manual meter readings performed by the Ft. Hood Energy Office during the period June 2002 to November 2002. The Ft. Hood Energy Office plans to continue these readings on a more frequent basis and the models will be updated when more readings become available.

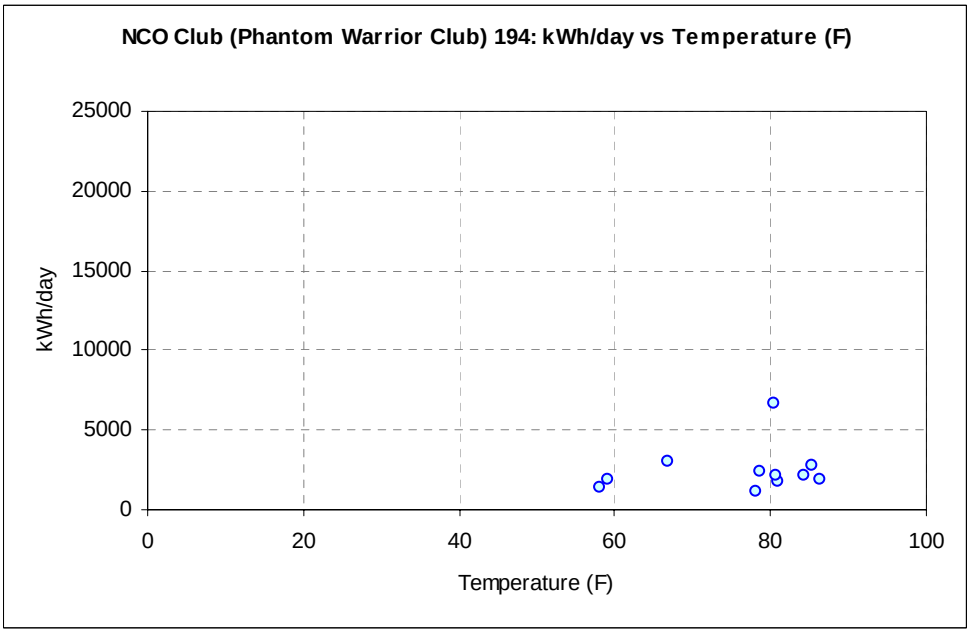
Building Number	Building Name	Building Size (ft2)	Electricity	Natural Gas
194	NCO Club (Phantom Warrior Club)	19,023	√	√
410	Headquarters Building	102,391	√	√
1001	Third Corp Headquarters	312,800	√	√
4351	Motor Pool	16,317	√	√
5485	Pershing Youth Center	17,519	√	√
5764	Officers Club	36,649	√	√
6602	Bronco Youth Center	22,100	√	√
9212	Patton Inn	1,612	√	√
22020	Admin	21,096	√	√
28000	Headquarters Bldg	129,635	√	√
42000	Sports USA	23,341	√	√
50012	Community Event Center	4,203	√	√
52024	COMMAND Child Care	34,779	√	√
52381	Golf Pro Shop	3,061	√	√
70005	Longhorn Saloon	5,718	√	√
85018	Walker Youth Service Center	15,652	√	√
85020	Commissary	105,659	√	√
91012	Admin/ Operational Testing	86,292	√	√
91014	Admin	26,224	√	√

12.3.1. 194 NCO Club (Phantom Warrior Club)

12.3.1.1. Electricity Use From Manual Readings

194 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per per.	Use per Period	Use per day	avg temp(F)
									80	6697	
6/5/2002	37412	15324	6/5/2002	6/19/2002	14	15324	15634	310	24800	1771	81.1
6/19/2002	37426	15634	6/19/2002	6/26/2002	7	15634	16220	586	46880	6697	80.6
6/26/2002	37433	16220	6/26/2002	7/10/2002	14	16220	16174	-46	-3680	-263	79.7
7/10/2002	37447	16174	7/10/2002	7/19/2002	9	16174	16413	239	19120	2124	80.6
7/19/2002	37456	16413	7/19/2002	8/2/2002	14	16413	16753	340	27200	1943	86.4
8/2/2002	37470	16753	8/2/2002	8/15/2002	13	16753	17100	347	27760	2135	84.3
8/15/2002	37483	17100	8/15/2002	9/4/2002	20	17100	17797	697	55760	2788	85.4
9/4/2002	37503	17797	9/4/2002	9/25/2002	21	17797	18102	305	24400	1162	78.2
9/25/2002	37524	18102	9/25/2002	10/4/2002	9	18102	18377	275	22000	2444	78.7
10/4/2002	37533	18377	10/4/2002	10/18/2002	14	18377	18896	519	41520	2966	66.9
10/18/2002	37547	18896	10/18/2002	11/7/2002	20	18896	19247	351	28080	1404	58.1
11/7/2002	37567	19247	11/7/2002	11/19/2002	12	19247	19522	275	22000	1833	59.1
11/19/2002	37579	19522	11/19/2002	1/0/1900	####	19522					

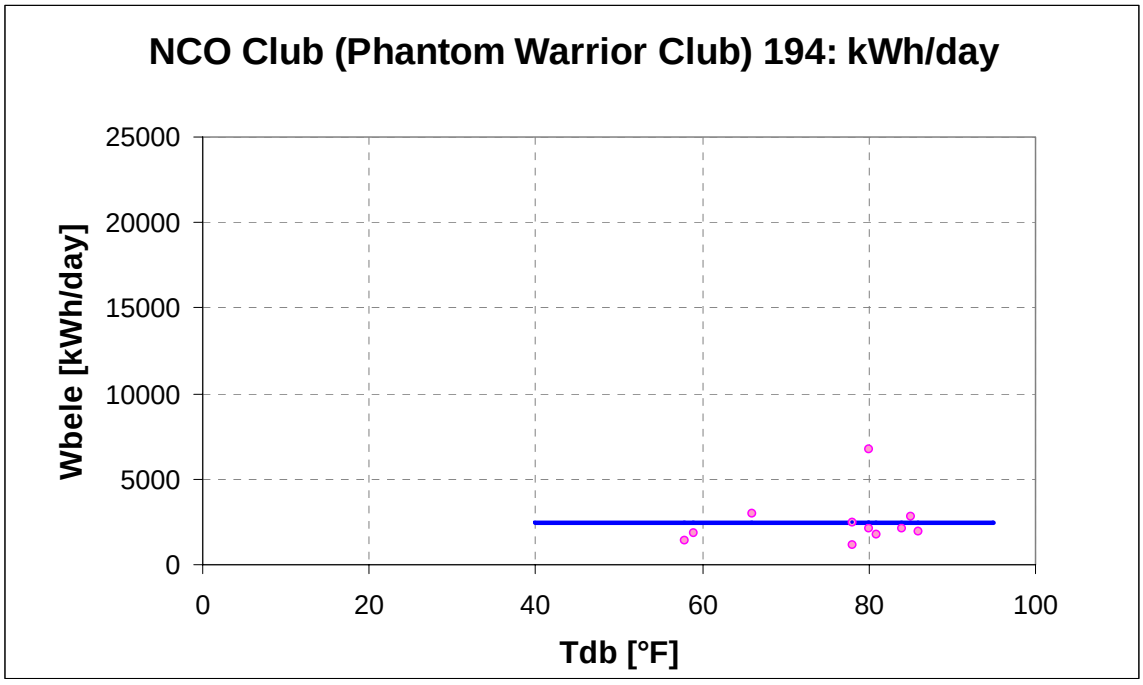

NCO Club (Phantom Warrior Club) 194: kWh/day
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date


NCO Club (Phantom Warrior Club) 194: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
Temperature (F)

12.3.1.1.1. Baseline Model From Manual Readings

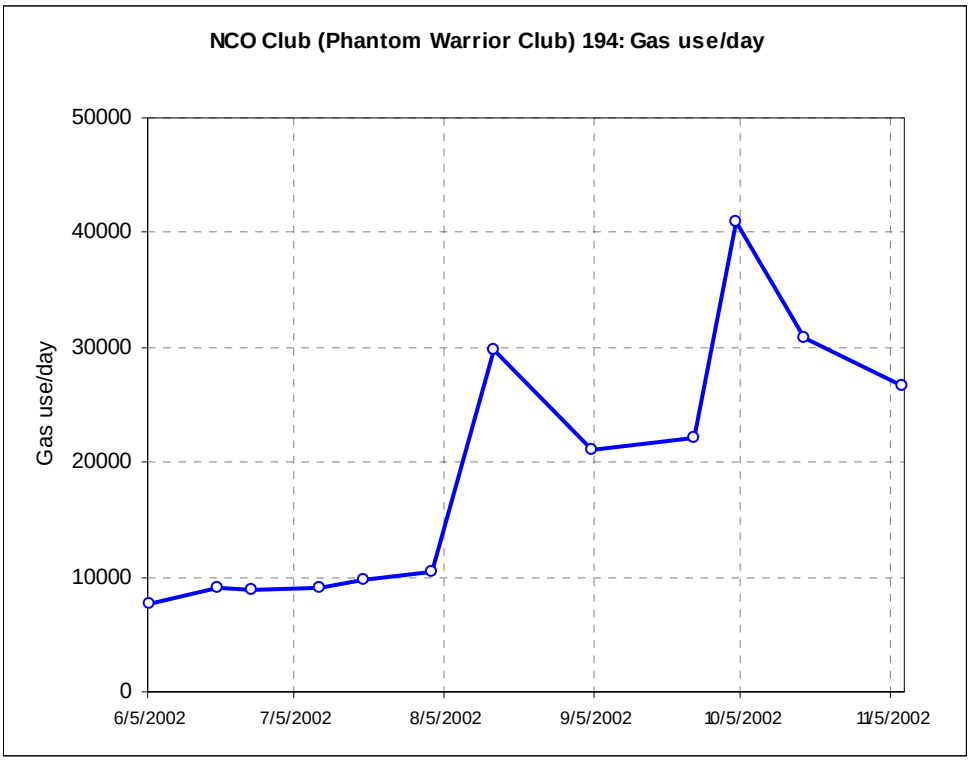
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 1
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

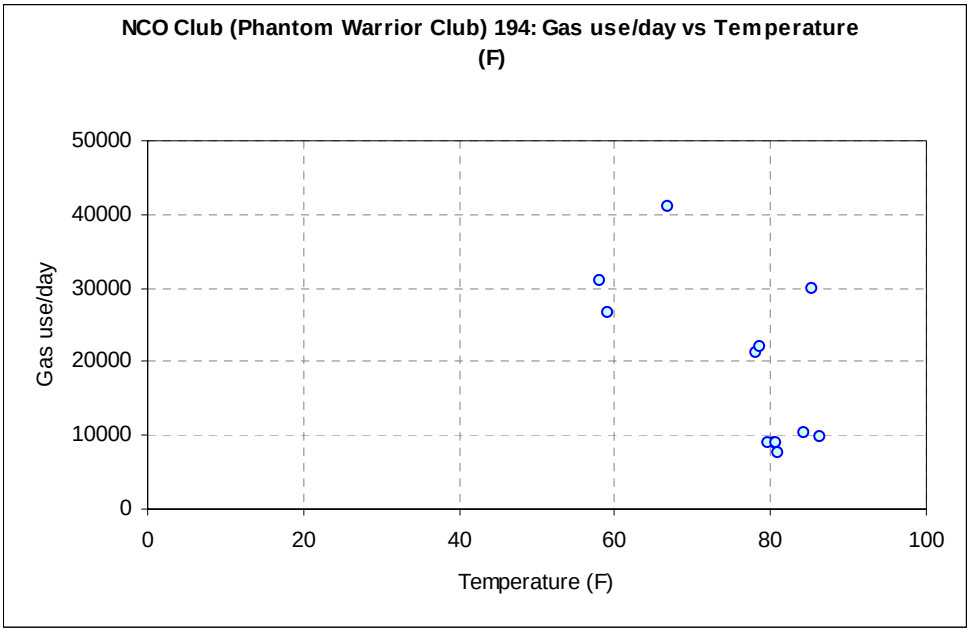
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =    1
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     11
       Ymean =  2478.818
      StdDev =  1498.858
    CV-StDev =    60.467 %
```


NCO Club (Phantom Warrior Club) 194: kWh/day
Wbele [kWh/day]
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.1.2. Natural Gas From Manual Readings

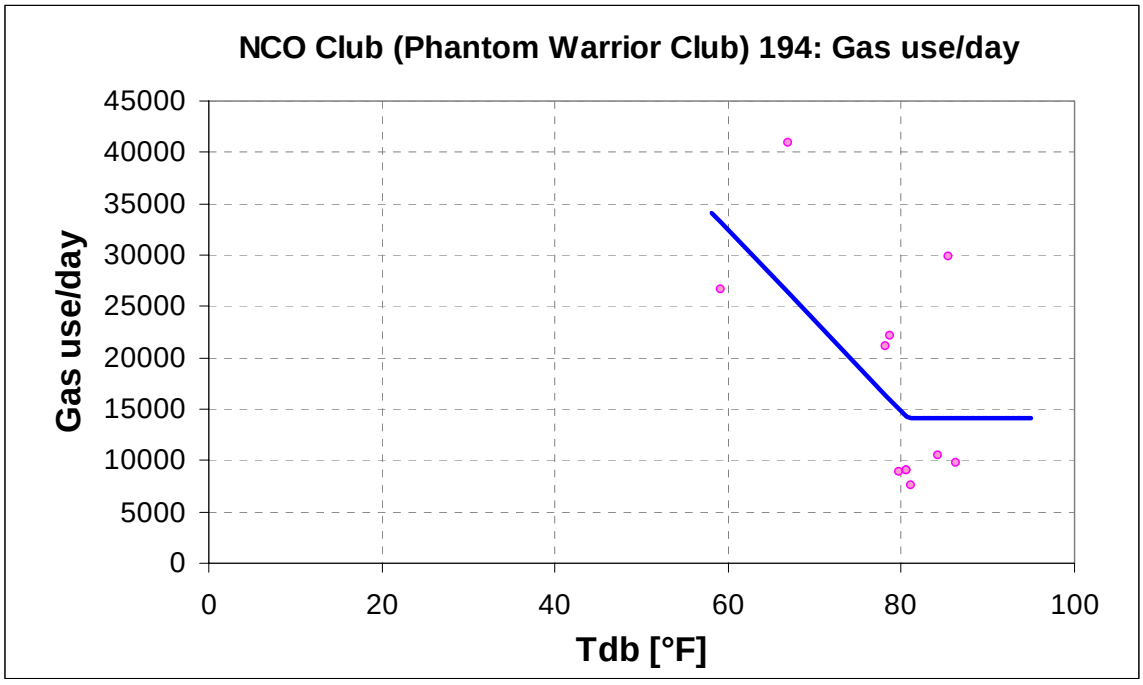
194 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F
									10		
6/5/2002	37412	4860944	6/5/2002	6/19/2002	14	4860944	4871579	10635	106350	7596	81
6/19/2002	37426	4871579	6/19/2002	6/26/2002	7	4871579	4877909	6330	63300	9043	80
6/26/2002	37433	4877909	6/26/2002	7/10/2002	14	4877909	4890349	12440	124400	8886	79
7/10/2002	37447	4890349	7/10/2002	7/19/2002	9	4890349	4898424	8075	80750	8972	80
7/19/2002	37456	4898424	7/19/2002	8/2/2002	14	4898424	4912148	13724	137240	9803	86
8/2/2002	37470	4912148	8/2/2002	8/15/2002	13	4912148	4925708	13560	135600	10431	84
8/15/2002	37483	4925708	8/15/2002	9/4/2002	20	4925708	4985427	59719	597190	29860	85
9/4/2002	37503	4960953	9/4/2002	9/25/2002	21	4960953	5005305	44352	443520	21120	78
9/25/2002	37524	4985427	9/25/2002	10/4/2002	9	4985427	5005305	19878	198780	22087	78
10/4/2002	37533	5005305	10/4/2002	10/18/2002	14	5005305	5062587	57282	572820	40916	66
10/18/2002	37547	5062587	10/18/2002	11/7/2002	20	5062587	5124316	61729	617290	30865	58
11/7/2002	37567	5124316	11/7/2002	11/19/2002	12	5124316	5156227	31911	319110	26593	59
11/19/2002	37579	5156227	11/19/2002	1/0/1900	-37579	5156227	0	-5E+06	-5E+07	1372	


NCO Club (Phantom Warrior Club) 194: Gas use/day
Gas use/day
50000
40000
30000
20000
10000
0
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002


NCO Club (Phantom Warrior Club) 194: Gas use/day vs Temperature (F)
Gas use/day
50000
40000
30000
20000
10000
0
0
20
40
60
80
100
Temperature (F)

12.3.1.2.1. Baseline Model From Manual Readings

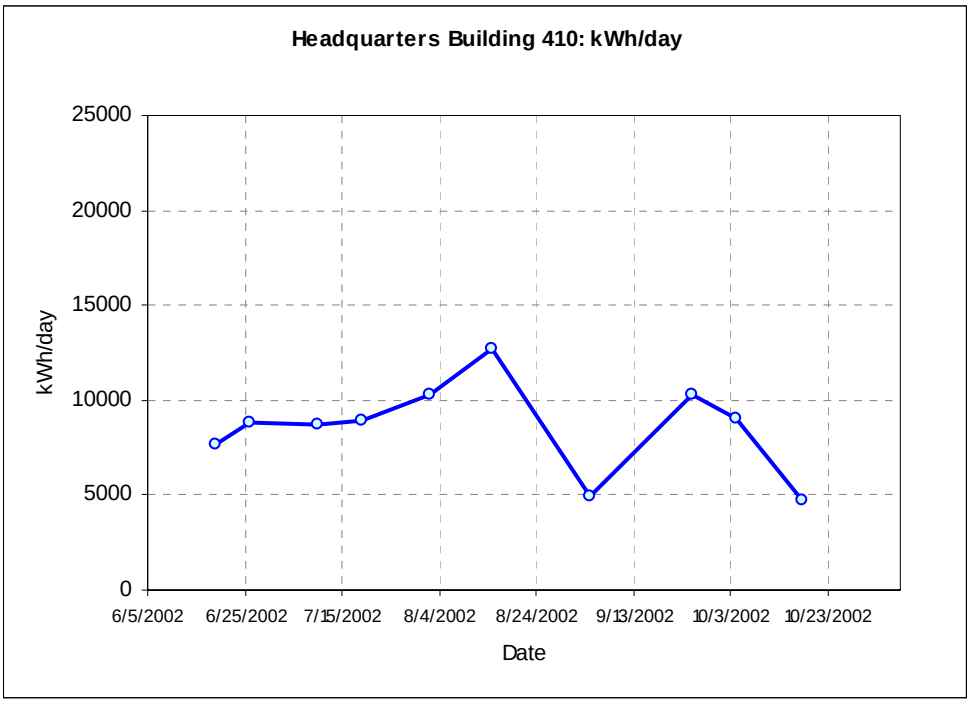
```
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 2
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable =1
Number of independent X variables (0 to 6)  = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           3P Heating
    Grouping column No =    4
    Value for grouping =    2
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   3
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     12
          R2 =     0.470
       AdjR2 =     0.470
        RMSE =   8619.0869
     CV-RMSE =    45.730%
           p =     0.353
          DW =     1.218 (p>0)
          N1 =      8
          N2 =      4
         Ycp =  14134.5615 (   2949.6016)
          LS =   -883.4305 (    296.9289)
          RS =      0.0000 (      0.0000)
         Xcp =     80.7400 (      0.5660)
```

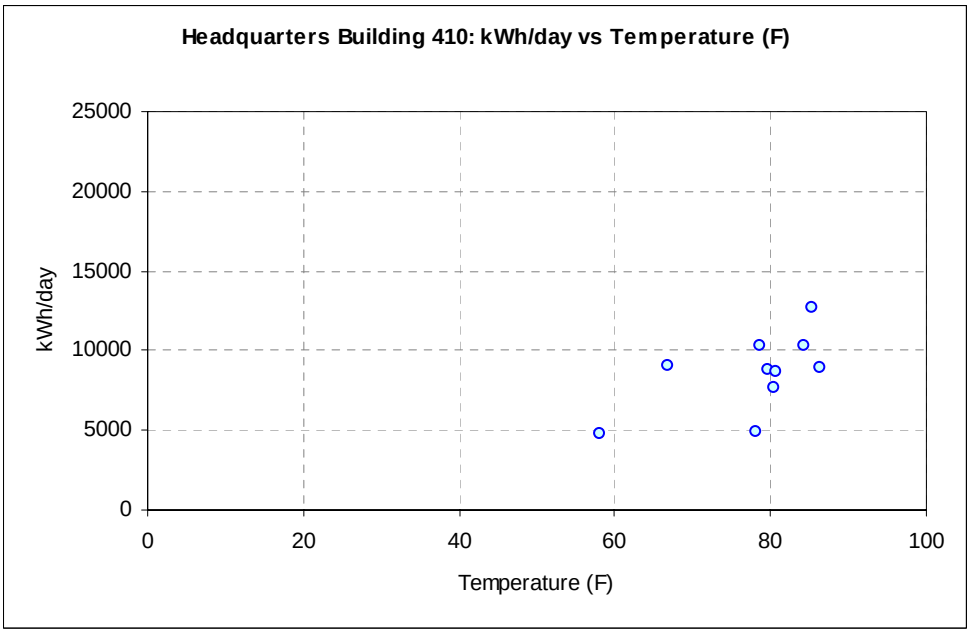

NCO Club (Phantom Warrior Club) 194: Gas use/day
Gas use/day
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.2. 410 Headquarters Building

12.3.2.1. Electricity Use From Manual Readings

410 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									240	12732	
6/5/2002	37412	4789	6/5/2002	6/19/2002	14	4789	4304	-485	-116400		81.1
6/19/2002	37426	4304	6/19/2002	6/26/2002	7	4304	4527	223	53520	7646	80.6
6/26/2002	37433	4527	6/26/2002	7/10/2002	14	4527	5041	514	123360	8811	79.7
7/10/2002	37447	5041	7/10/2002	7/19/2002	9	5041	5368	327	78480	8720	80.6
7/19/2002	37456	5368	7/19/2002	8/2/2002	14	5368	5887	519	124560	8897	86.4
8/2/2002	37470	5887	8/2/2002	8/15/2002	13	5887	6444	557	133680	10283	84.3
8/15/2002	37483	6444	8/15/2002	9/4/2002	20	6444	7505	1061	254640	12732	85.4
9/4/2002	37503	7505	9/4/2002	9/25/2002	21	7505	7936	431	103440	4926	78.2
9/25/2002	37524	7936	9/25/2002	10/4/2002	9	7936	8323	387	92880	10320	78.7
10/4/2002	37533	8323	10/4/2002	10/18/2002	14	8323	8850	527	126480	9034	66.9
10/18/2002	37547	8850	10/18/2002	11/7/2002	20	8850	9243	393	94320	4716	58.1
11/7/2002	37567	9243	11/7/2002	11/19/2002	12	9243	815	-8428	-2E+06		59.1
11/19/2002	37579	815	11/19/2002	1/0/1900	####	815	0	-815	-195600	5	0.0

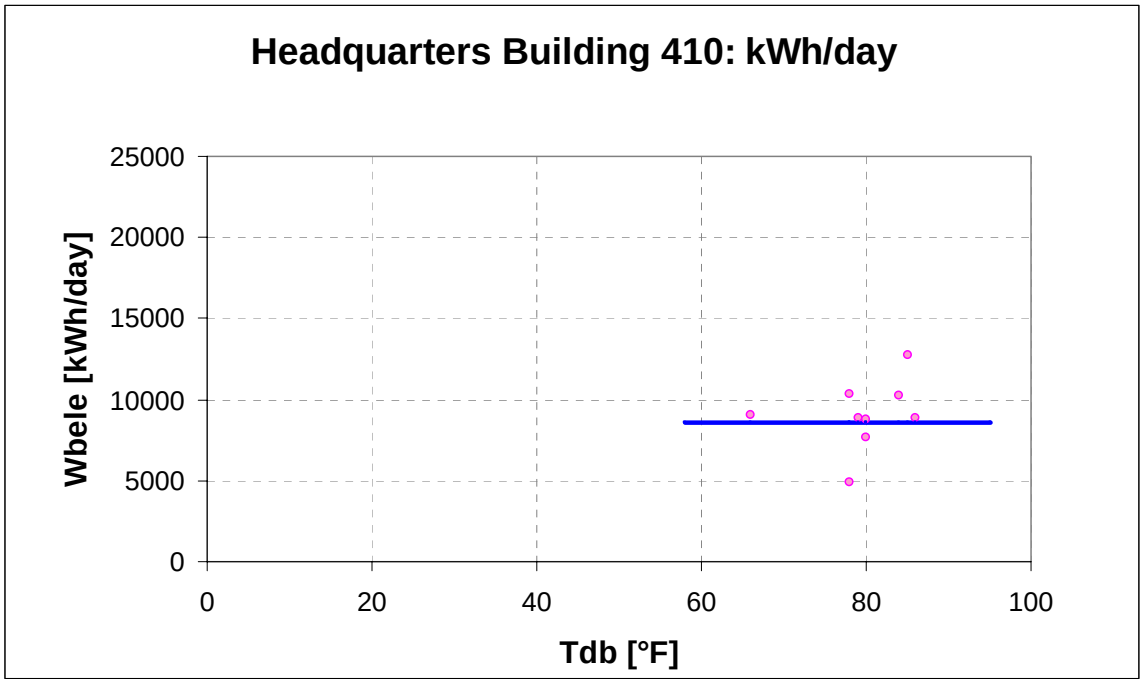

Headquarters Building 410: kWh/day
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date


Headquarters Building 410: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
Temperature (F)

12.3.2.1.1. Baseline Model From Manual Readings

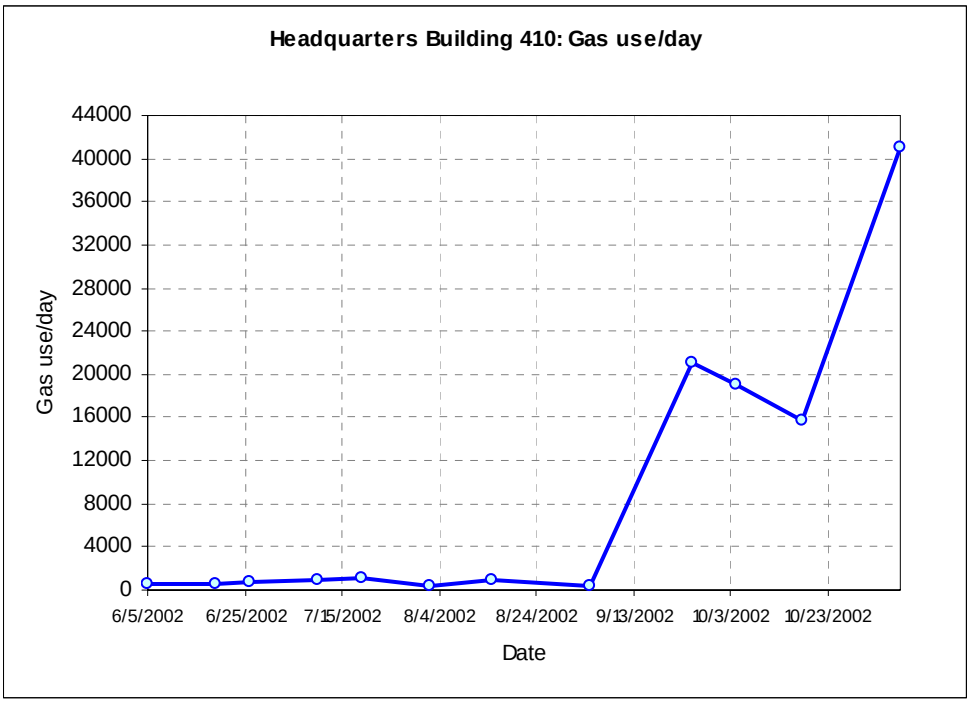
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 3
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

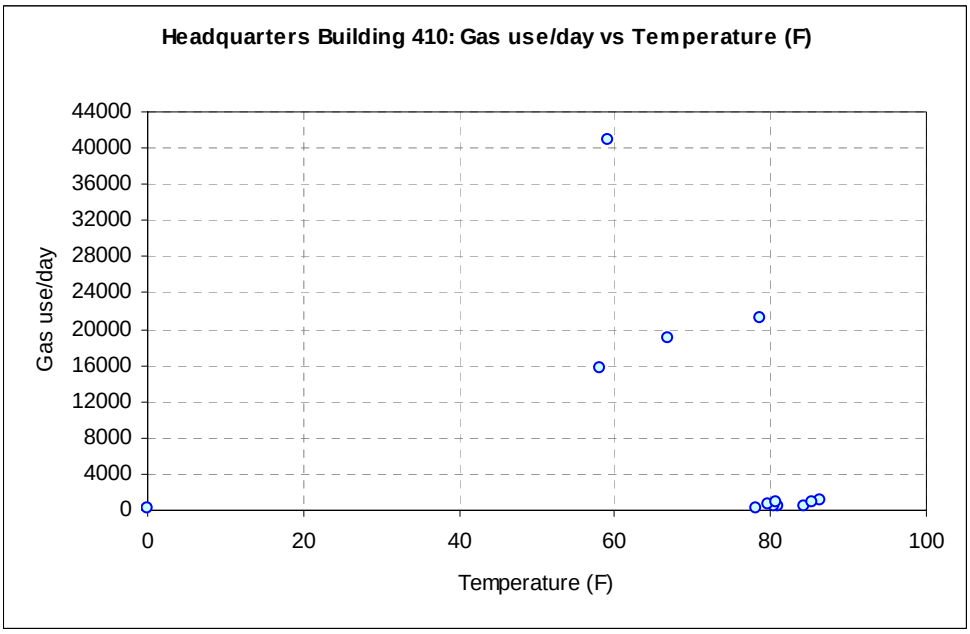
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =    3
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     10
       Ymean =  8608.500
      StdDev =  2419.663
    CV-StDev =    28.108 %
```


Headquarters Building 410: kWh/day
Wbele [kWh/day]
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.2.2. Natural Gas From Manual Readings

410 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									10		
6/5/2002	37412	908060	06/05/02	06/19/02	14	908060	908824	764	7640	546	81.1
6/19/2002	37426	908824	06/19/02	06/26/02	7	908824	909191	367	3670	524	80.6
6/26/2002	37433	909191	06/26/02	07/10/02	14	909191	910127	936	9360	669	79.7
7/10/2002	37447	910127	07/10/02	07/19/02	9	910127	910959	832	8320	924	80.6
7/19/2002	37456	910959	07/19/02	08/02/02	14	910959	912397	1438	14380	1027	86.4
8/2/2002	37470	912397	08/02/02	08/15/02	13	912397	912979	582	5820	448	84.3
8/15/2002	37483	912979	08/15/02	09/04/02	20	912979	914877	1898	18980	949	85.4
9/4/2002	37503	914877	09/04/02	09/25/02	21	914877	915530	653	6530	311	78.2
9/25/2002	37524	915530	09/25/02	10/04/02	9	915530	934560	19030	190300	21144	78.7
10/4/2002	37533	934560	10/04/02	10/18/02	14	934560	961254	26694	266940	19067	66.9
10/18/2002	37547	961254	10/18/02	11/07/02	20	961254	992567	31313	313130	15657	58.1
11/7/2002	37567	992567	11/07/02	11/19/02	12	992567	1041741	49174	491740	40978	59.1
11/19/2002	37579	1041741	11/19/02	01/00/00	####	1041741	0	-1E+06	-1E+07	277	0.0

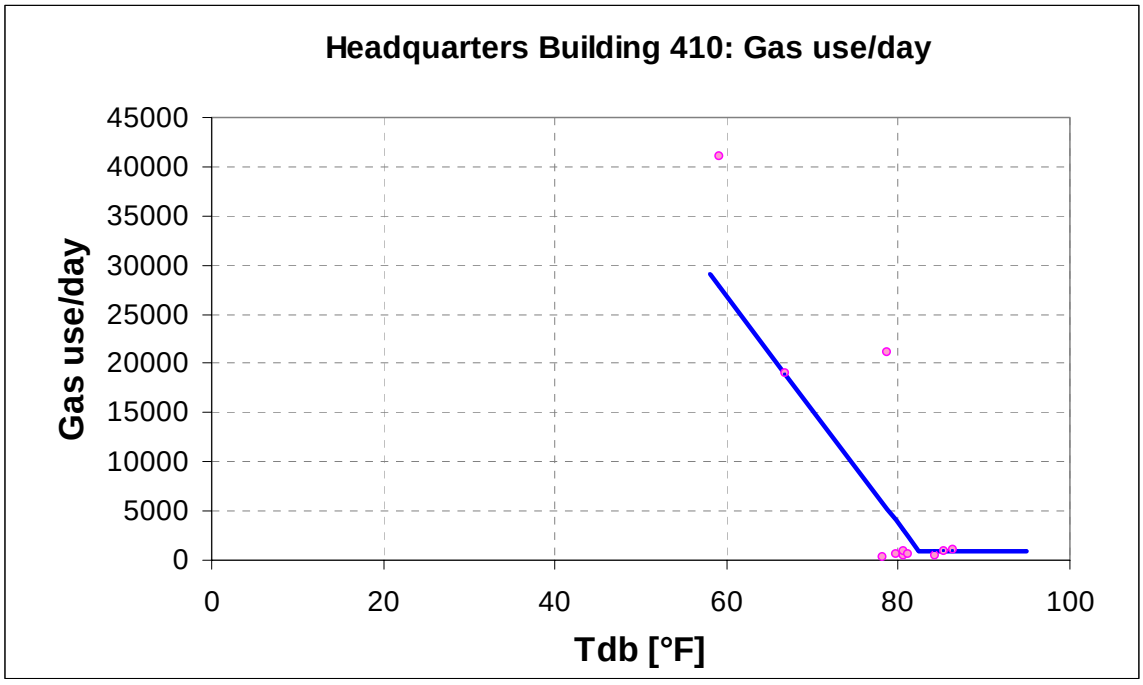

Headquarters Building 410: Gas use/day
Gas use/day
44000
40000
36000
32000
28000
24000
20000
16000
12000
8000
4000
0
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date


Headquarters Building 410: Gas use/day vs Temperature (F)
Gas use/day
44000
40000
36000
32000
28000
24000
20000
16000
12000
8000
4000
0
0
20
40
60
80
100
Temperature (F)

12.3.2.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 4
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

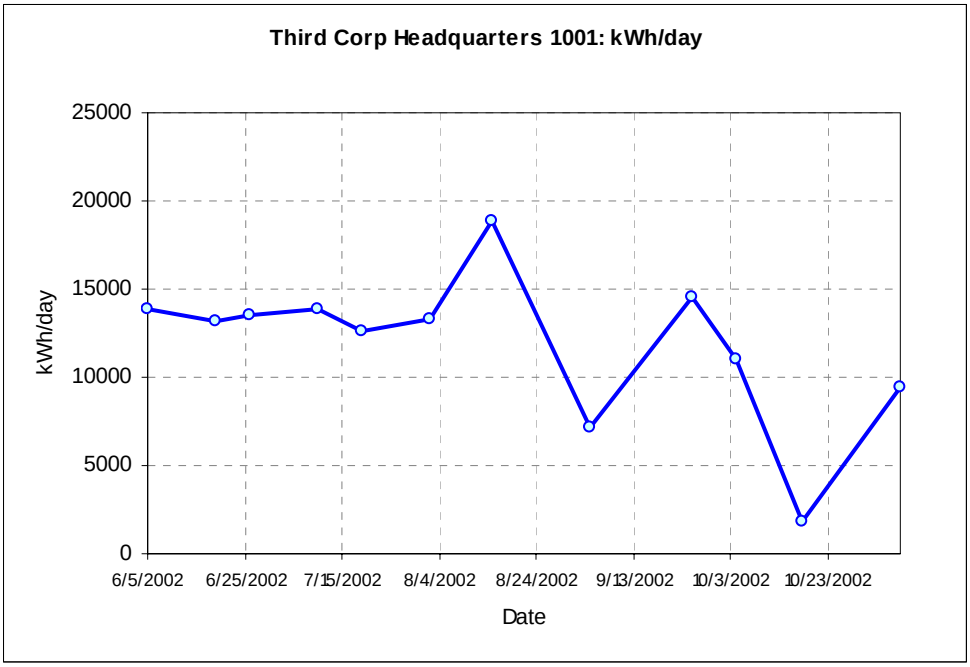
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           3P Heating
    Grouping column No =    4
    Value for grouping =    4
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   3
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     12
          R2 =     0.647
       AdjR2 =     0.647
        RMSE =   8125.7783
     CV-RMSE =    95.369%
           p =    -0.368
          DW =     2.466 (p>0)
          N1 =      9
          N2 =      3
         Ycp =    929.7940 (   2941.5186)
          LS =  -1153.8408 (    269.7992)
          RS =      0.0000 (      0.0000)
         Xcp =     82.4380 (      0.5660)
```

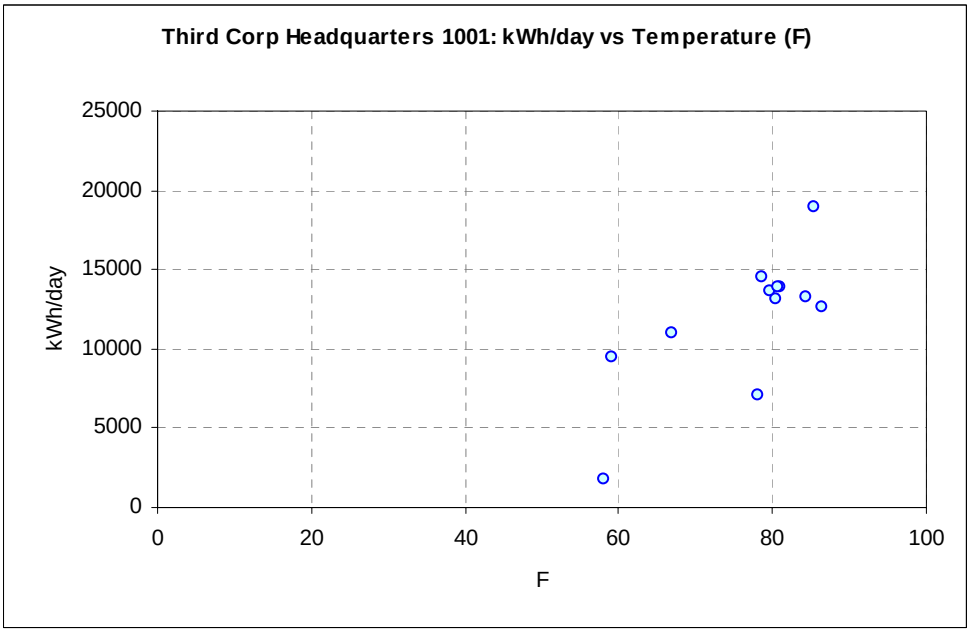

Headquarters Building 410: Gas use/day
Gas use/day
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.3. 1001 Third Corp Headquarters

12.3.3.1. Electricity Use From Manual Readings

1001 Elec 1		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1920	18912	
6/5/2002	37412	6408	6/5/2002	6/19/2002	14	6408	6509	101	193920	13851	81.1
6/19/2002	37426	6509	6/19/2002	6/26/2002	7	6509	6557	48	92160	13166	80.6
6/26/2002	37433	6557	6/26/2002	7/10/2002	14	6557	6656	99	190080	13577	79.7
7/10/2002	37447	6656	7/10/2002	7/19/2002	9	6656	6721	65	124800	13867	80.6
7/19/2002	37456	6721	7/19/2002	8/2/2002	14	6721	6813	92	176640	12617	86.4
8/2/2002	37470	6813	8/2/2002	8/15/2002	13	6813	6903	90	172800	13292	84.3
8/15/2002	37483	6903	8/15/2002	9/4/2002	20	6903	7100	197	378240	18912	85.4
9/4/2002	37503	7100	9/4/2002	9/25/2002	21	7100	7178	78	149760	7131	78.2
9/25/2002	37524	7178	9/25/2002	10/4/2002	9	7178	7246	68	130560	14507	78.7
10/4/2002	37533	7246	10/4/2002	10/18/2002	14	7246	7326	80	153600	10971	66.9
10/18/2002	37547	7326	10/18/2002	11/7/2002	20	7326	7345	19	36480	1824	58.1
11/7/2002	37567	7345	11/7/2002	11/19/2002	12	7345	7404	59	113280	9440	59.1
11/19/2002	37579	7404	11/19/2002	1/0/1900	#####	7404	0	-7404	-1E+07	378	0.0

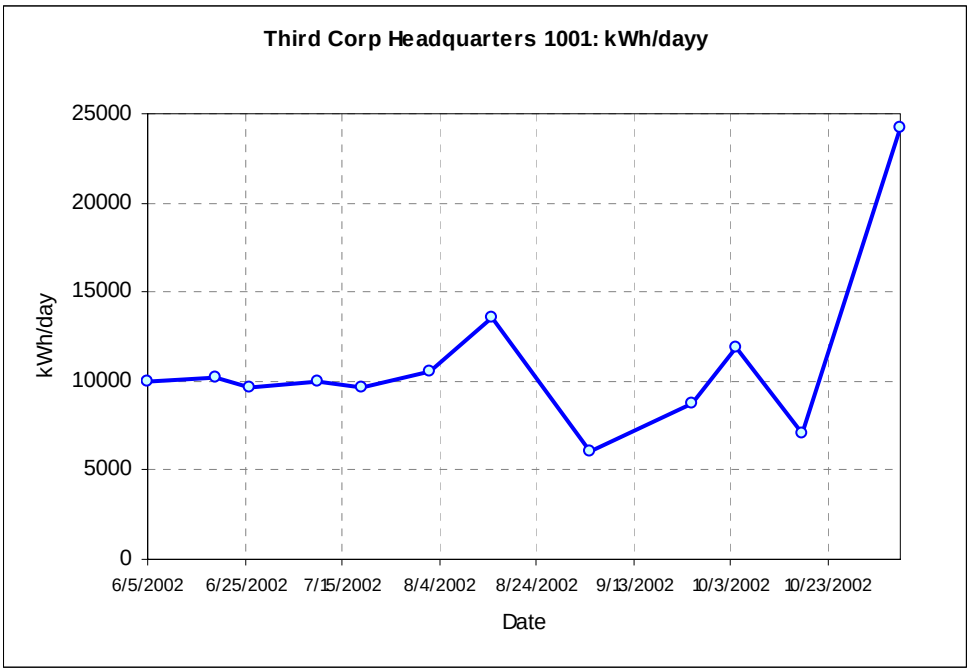


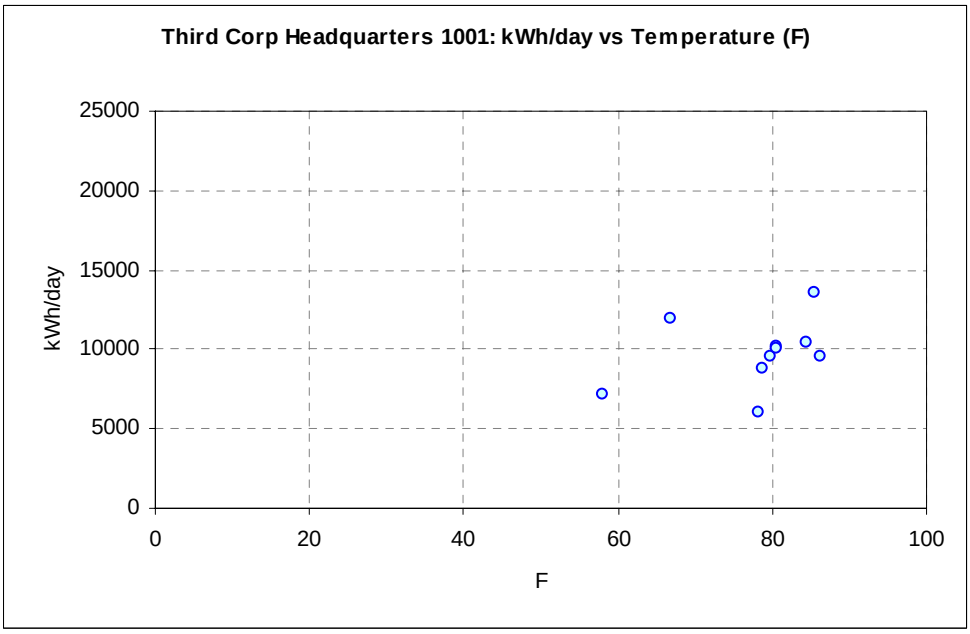


12.3.3.1.1. Baseline Model From Manual Readings

Baseline models from this sites are presented in the previous section that contains data from the data logger.

1001 Elec 2		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1920	24160	
6/5/2002	37412	2953	6/5/2002	6/19/2002	14	2953	3026	73	140160	10011	81.1
6/19/2002	37426	3026	6/19/2002	6/26/2002	7	3026	3063	37	71040	10149	80.6
6/26/2002	37433	3063	6/26/2002	7/10/2002	14	3063	3133	70	134400	9600	79.7
7/10/2002	37447	3133	7/10/2002	7/19/2002	9	3133	3180	47	90240	10027	80.6
7/19/2002	37456	3180	7/19/2002	8/2/2002	14	3180	3250	70	134400	9600	86.4
8/2/2002	37470	3250	8/2/2002	8/15/2002	13	3250	3321	71	136320	10486	84.3
8/15/2002	37483	3321	8/15/2002	9/4/2002	20	3321	3462	141	270720	13536	85.4
9/4/2002	37503	3462	9/4/2002	9/25/2002	21	3462	3528	66	126720	6034	78.2
9/25/2002	37524	3528	9/25/2002	10/4/2002	9	3528	3569	41	78720	8747	78.7
10/4/2002	37533	3569	10/4/2002	10/18/2002	14	3569	3656	87	167040	11931	66.9
10/18/2002	37547	3656	10/18/2002	11/7/2002	20	3656	3730	74	142080	7104	58.1
11/7/2002	37567	3730	11/7/2002	11/19/2002	12	3730	3881	151	289920	24160	59.1
11/19/2002	37579	3881	11/19/2002								


Third Corp Headquarters 1001: kWh/dayy
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date

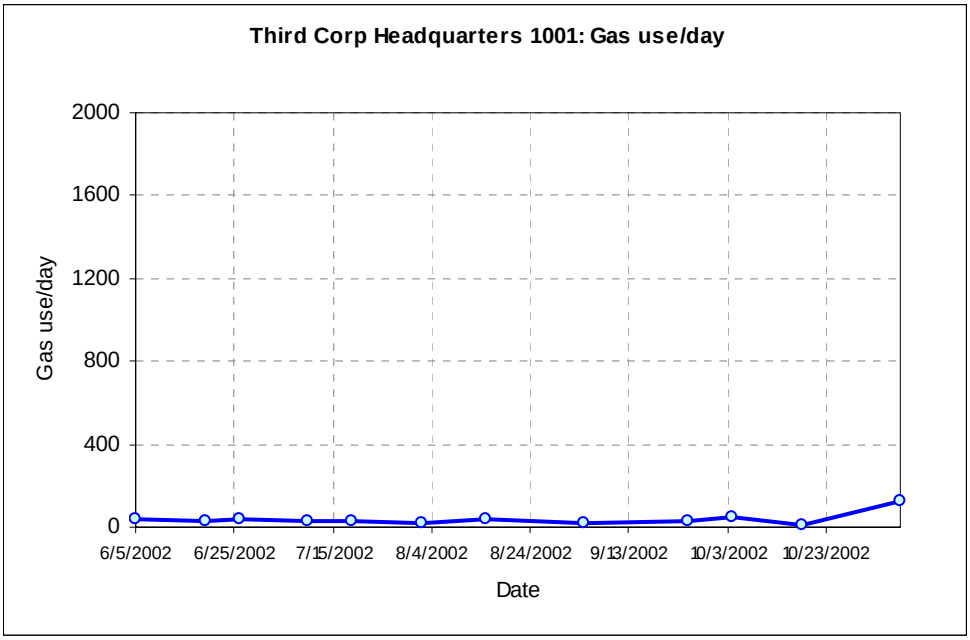

Third Corp Headquarters 1001: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
F

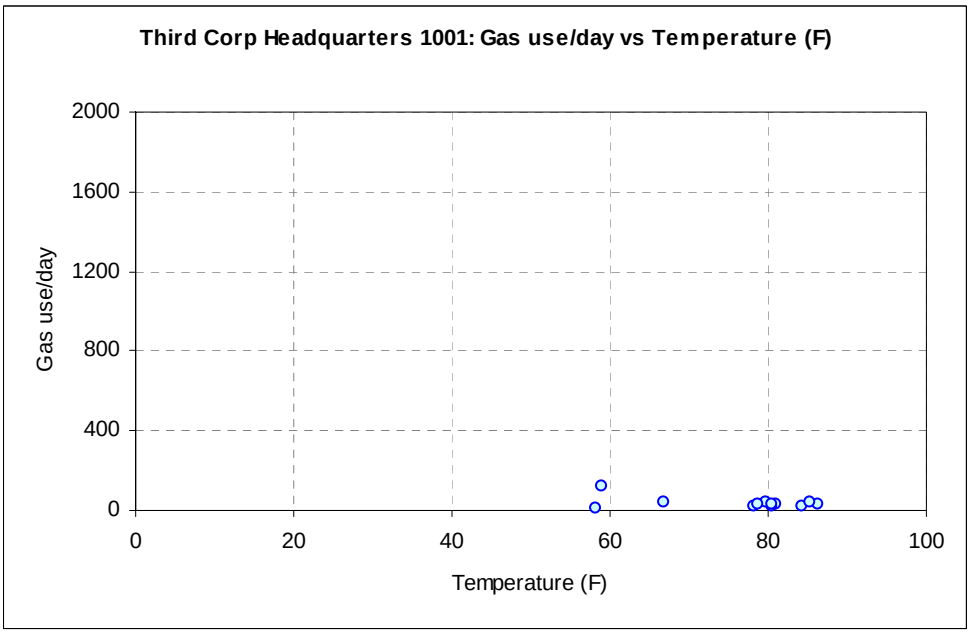
12.3.3.1.2. Baseline Model From Manual Readings

Baseline models for this site are calculated with data collected from the data logger.

12.3.3.2. Natural Gas From Manual Readings

1001 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Use per period	Use per day	avg temp(F)
6/5/2002	37412	5458	6/5/2002	6/19/2002	14	5458	5949	491	35	81.1
6/19/2002	37426	5949	6/19/2002	6/26/2002	7	5949	6122	173	25	80.6
6/26/2002	37433	6122	6/26/2002	7/10/2002	14	6122	6700	578	41	79.7
7/10/2002	37447	6700	7/10/2002	7/19/2002	9	6700	6988	288	32	80.6
7/19/2002	37456	6988	7/19/2002	8/2/2002	14	6988	7354	366	26	86.4
8/2/2002	37470	7354	8/2/2002	8/15/2002	13	7354	7662	308	24	84.3
8/15/2002	37483	7662	8/15/2002	9/4/2002	20	7662	8378	716	36	85.4
9/4/2002	37503	8378	9/4/2002	9/25/2002	21	8378	8719	341	16	78.2
9/25/2002	37524	8719	9/25/2002	10/4/2002	9	8719	8947	228	25	78.7
10/4/2002	37533	8947	10/4/2002	10/18/2002	14	8947	9561	614	44	66.9
10/18/2002	37547	9561	10/18/2002	11/7/2002	20	9561	9760	199	10	58.1
11/7/2002	37567	9760	11/7/2002	11/19/2002	12	9760	11215	1455	121	59.1
11/19/2002	37579	11215	11/19/2002	1/0/1900	#####	11215	0	-11215	0	0.0





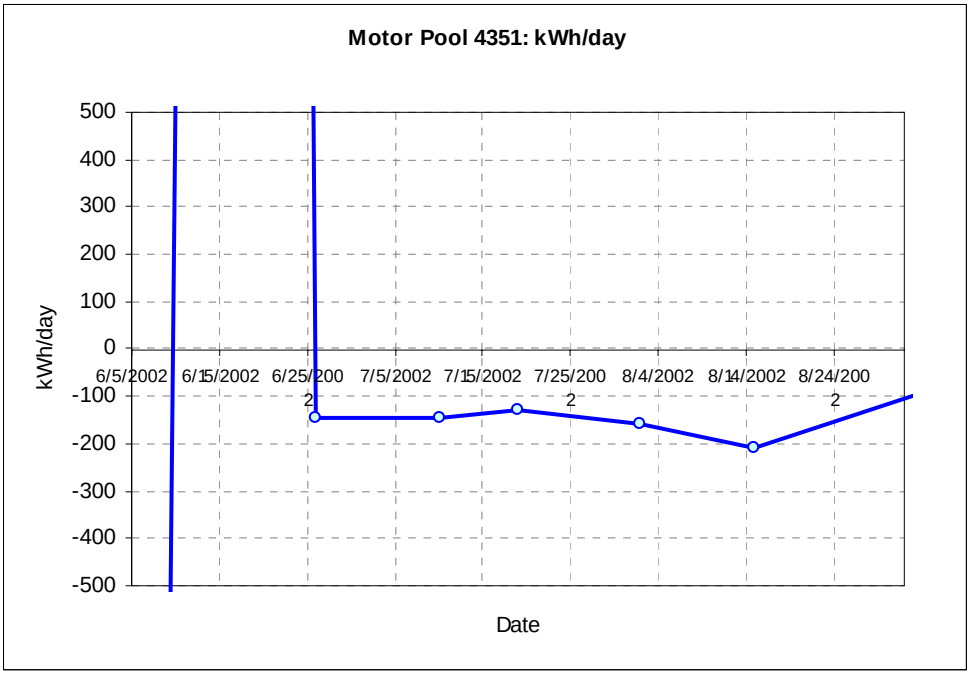
12.3.3.2.1. Baseline Model From Manual Readings

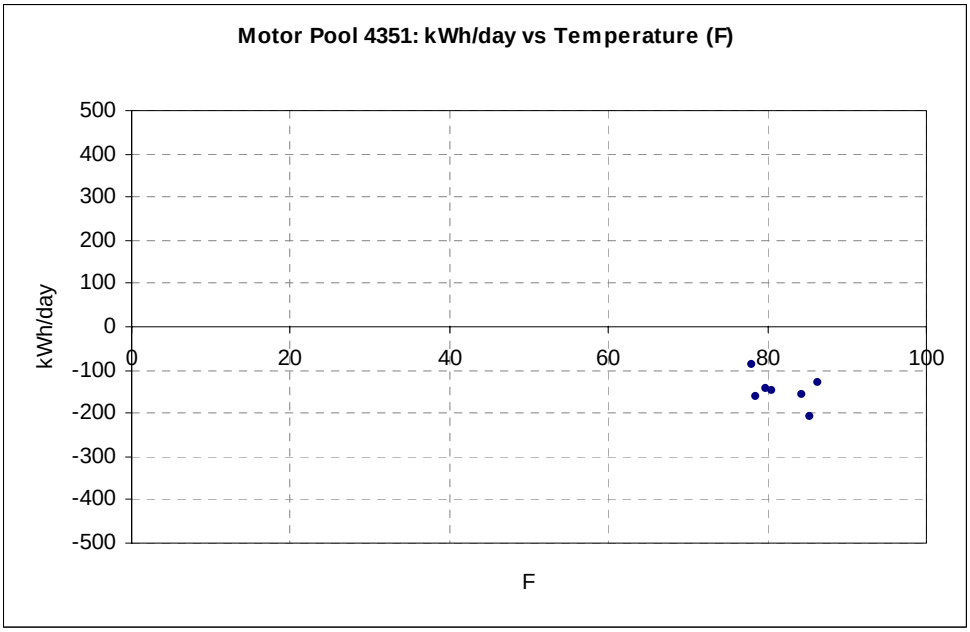
Baseline models for this site are calculated with data collected from the data logger.

12.3.4. 4351 Motor Pool

12.3.4.1. Electricity Use From Manual Readings

4351 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									120	17006	
6/5/2002	37412	2035	6/5/2002	6/19/2002	14	2035	1019	-1016	-121920	-8709	81.1
6/19/2002	37426	1019	6/19/2002	6/26/2002	7	1019	2011	992	119040	17006	80.6
6/26/2002	37433	2011	6/26/2002	7/10/2002	14	2011	1994	-17	-2040	-146	79.7
7/10/2002	37447	1994	7/10/2002	7/19/2002	9	1994	1983	-11	-1320	-147	80.6
7/19/2002	37456	1983	7/19/2002	8/2/2002	14	1983	1968	-15	-1800	-129	86.4
8/2/2002	37470	1968	8/2/2002	8/15/2002	13	1968	1951	-17	-2040	-157	84.3
8/15/2002	37483	1951	8/15/2002	9/4/2002	20	1951	1916	-35	-4200	-210	85.4
9/4/2002	37503	1916	9/4/2002	9/25/2002	21	1916	1901	-15	-1800	-86	78.2
9/25/2002	37524	1901	9/25/2002	10/4/2002	9	1901	1889	-12	-1440	-160	78.7
10/4/2002	37533	1889	10/4/2002	10/18/2002	14	1889	1872	-17	-2040	-146	66.9
10/18/2002	37547	1872	10/18/2002	11/7/2002	20	1872	1856	-16	-1920	-96	58.1
11/7/2002	37567	1856	11/7/2002	11/19/2002	12	1856	1845	-11	-1320	-110	59.1
11/19/2002	37579	1845	11/19/2002	1/0/1900	#####	1845	0	-1845	-221400	6	0.0



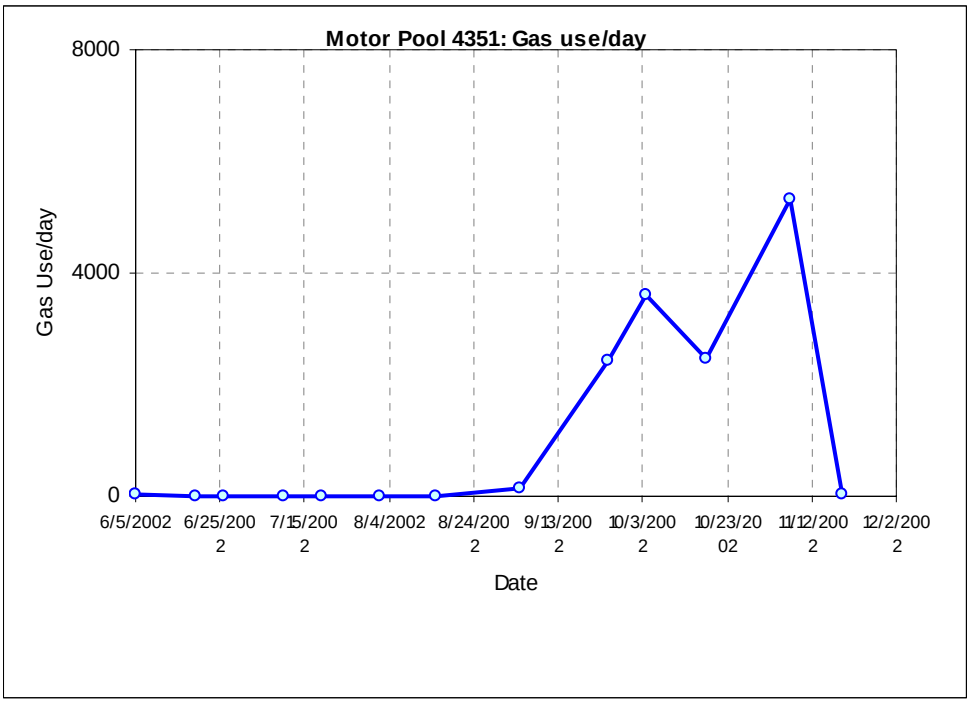


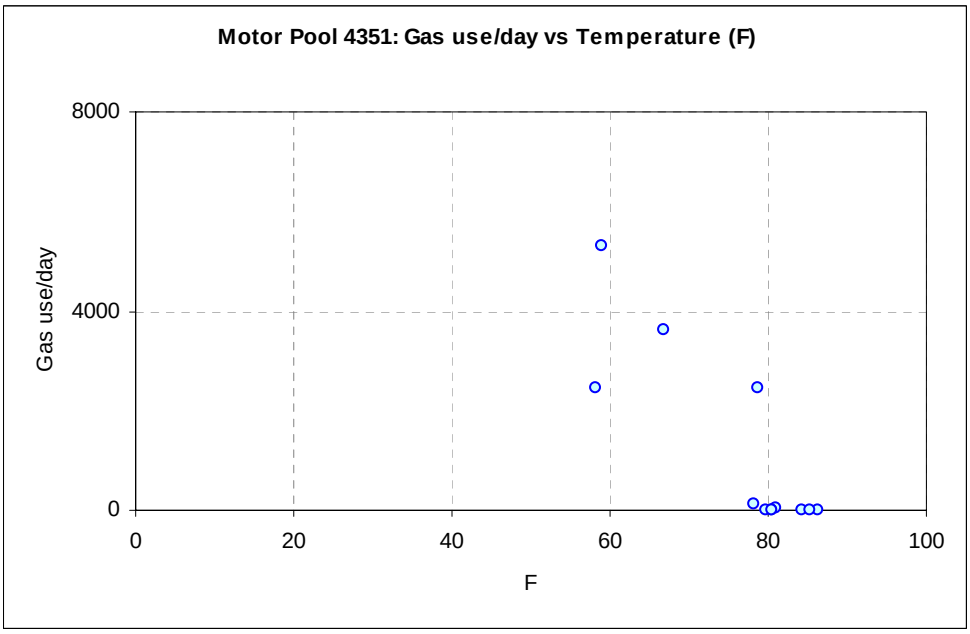
12.3.4.1.1. Baseline Model From Manual Readings

No baseline models are available from this site.

12.3.4.2. Natural Gas From Manual Readings

4351 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1		
6/5/2002	37412	827904	6/5/2002	6/19/2002	14	827904	828276	372	372	27	81.1
6/19/2002	37426	828276	6/19/2002	6/26/2002	7	828276	828278	2	2	0	80.6
6/26/2002	37433	828278	6/26/2002	7/10/2002	14	828278	828283	5	5	0	79.7
7/10/2002	37447	828283	7/10/2002	7/19/2002	9	828283	828286	3	3	0	80.6
7/19/2002	37456	828286	7/19/2002	8/2/2002	14	828286	828292	6	6	0	86.4
8/2/2002	37470	828292	8/2/2002	8/15/2002	13	828292	828298	6	6	0	84.3
8/15/2002	37483	828298	8/15/2002	9/4/2002	20	828298	828310	12	12	1	85.4
9/4/2002	37503	828310	9/4/2002	9/25/2002	21	828310	831075	2765	2765	132	78.2
9/25/2002	37524	831075	9/25/2002	10/4/2002	9	831075	852972	21897	21897	2433	78.7
10/4/2002	37533	852972	10/4/2002	10/18/2002	14	852972	903432	50460	50460	3604	66.9
10/18/2002	37547	903432	10/18/2002	11/7/2002	20	903432	952833	49401	49401	2470	58.1
11/7/2002	37567	952833	11/7/2002	11/19/2002	12	952833	1016570	63737	63737	5311	59.1
11/19/2002	37579	1016570	11/19/2002	1/0/1900	####	1016570	0	-1E+06	-1E+06	27	

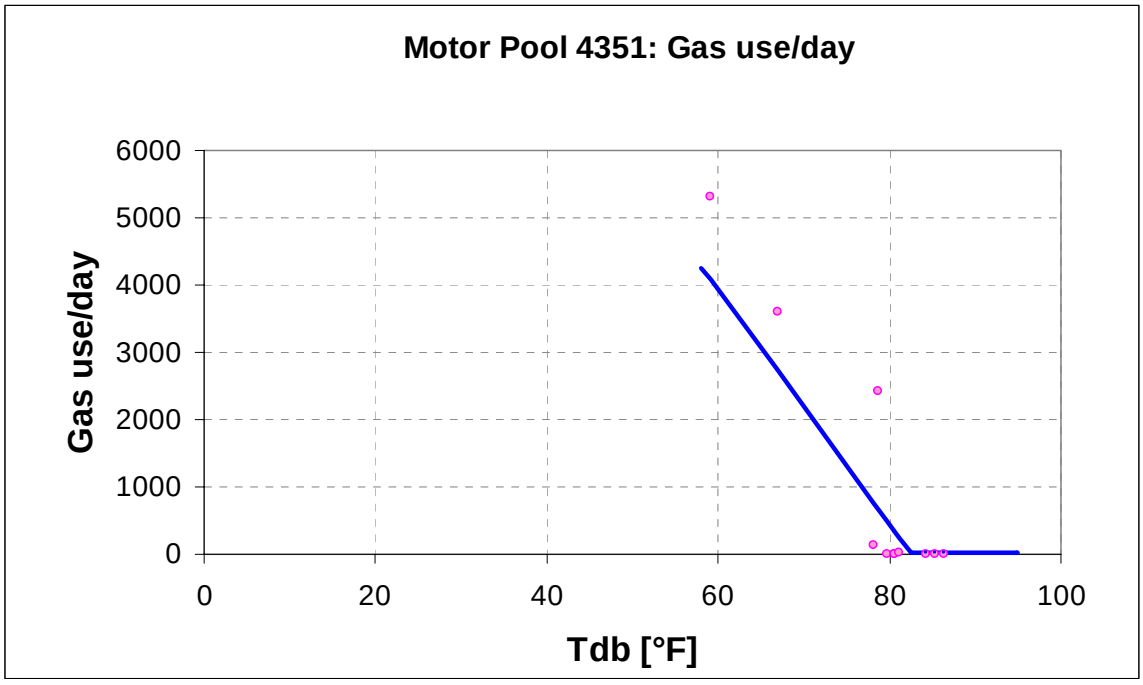

Motor Pool 4351: Gas use/day
8000
4000
0
Gas Use/day
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
11/12/2002
12/2/2002
Date


Motor Pool 4351: Gas use/day vs Temperature (F)
8000
4000
0
Gas use/day
0
20
40
60
80
100
F

12.3.4.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 8
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

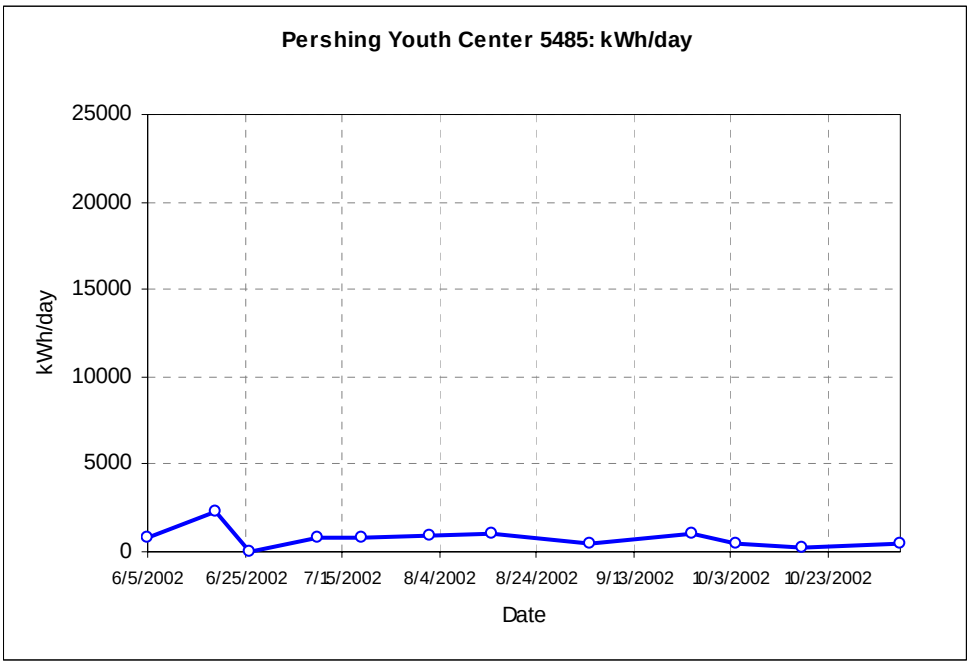
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           3P Heating
    Grouping column No =    4
    Value for grouping =    8
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   3
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     12
          R2 =     0.743
       AdjR2 =     0.743
        RMSE =    974.7501
     CV-RMSE =    83.682%
           p =    -0.305
          DW =     2.442 (p>0)
          N1 =      9
          N2 =      3
         Ycp =     20.4308 (    352.8579)
          LS =   -173.9611 (     32.3645)
          RS =      0.0000 (      0.0000)
         Xcp =     82.4380 (      0.5660)
```

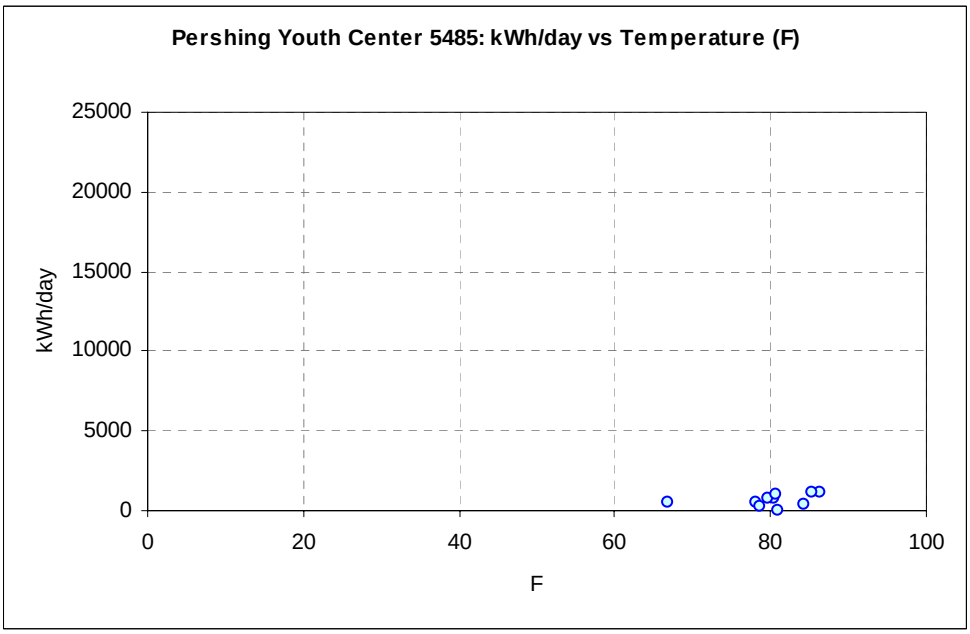

Motor Pool 4351: Gas use/day
Gas use/day
6000
5000
4000
3000
2000
1000
0
0
20
40
60
80
100
Tdb [°F]

12.3.5. 5485 Pershing Youth Center

12.3.5.1. Electricity Use From Manual Readings

5485 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									80	2320	
6/5/2002	37412	23280	6/5/2002	6/19/2002	14	23280	23412	132	10560	754	81.1
6/19/2002	37426	23412	6/19/2002	6/26/2002	7	23412	23615	203	16240	2320	80.6
6/26/2002	37433	23615	6/26/2002	7/10/2002	14	23615	23622	7	560	40	79.7
7/10/2002	37447	23622	7/10/2002	7/19/2002	9	23622	23710	88	7040	782	80.6
7/19/2002	37456	23710	7/19/2002	8/2/2002	14	23710	23851	141	11280	806	86.4
8/2/2002	37470	23851	8/2/2002	8/15/2002	13	23851	24006	155	12400	954	84.3
8/15/2002	37483	24006	8/15/2002	9/4/2002	20	24006	24273	267	21360	1068	85.4
9/4/2002	37503	24273	9/4/2002	9/25/2002	21	24273	24386	113	9040	430	78.2
9/25/2002	37524	24386	9/25/2002	10/4/2002	9	24386	24507	121	9680	1076	78.7
10/4/2002	37533	24507	10/4/2002	10/18/2002	14	24507	24596	89	7120	509	66.9
10/18/2002	37547	24596	10/18/2002	11/7/2002	20	24596	24659	63	5040	252	58.1
11/7/2002	37567	24659	11/7/2002	11/19/2002	12	24659	24731	72	5760	480	59.1
11/19/2002	37579	24731	11/19/2002	1/0/1900	#####	24731	0	-24731	-2E+06	53	0.0

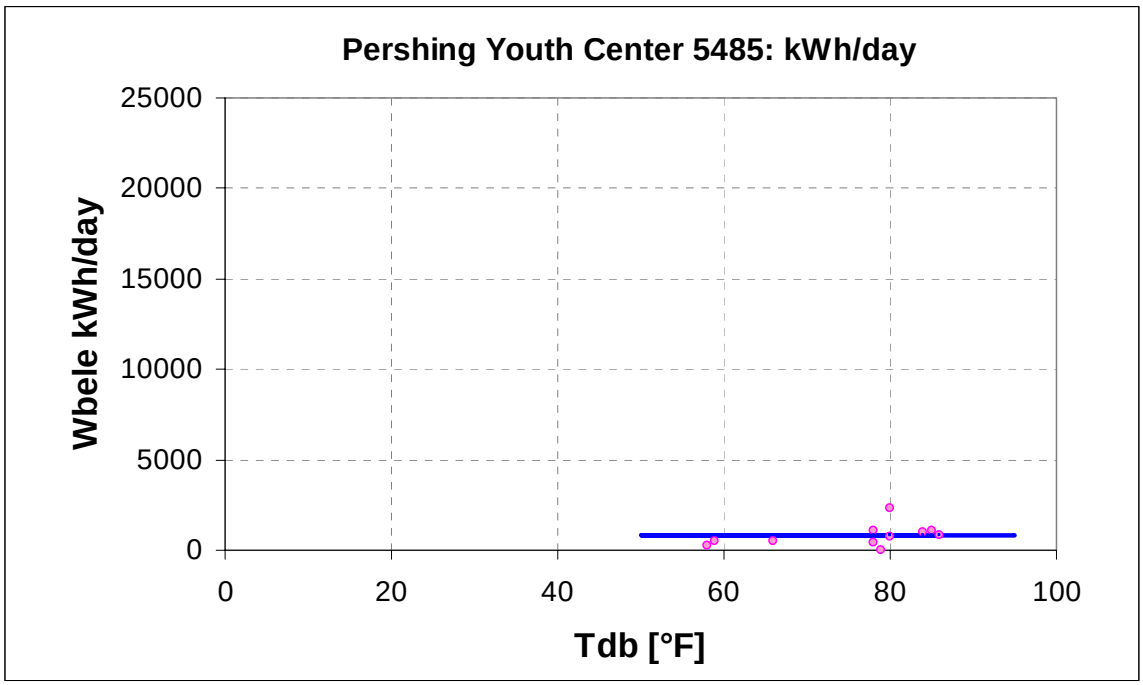

Pershing Youth Center 5485: kWh/day
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date


Pershing Youth Center 5485: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
F

12.3.5.1.1. Baseline Model From Manual Readings

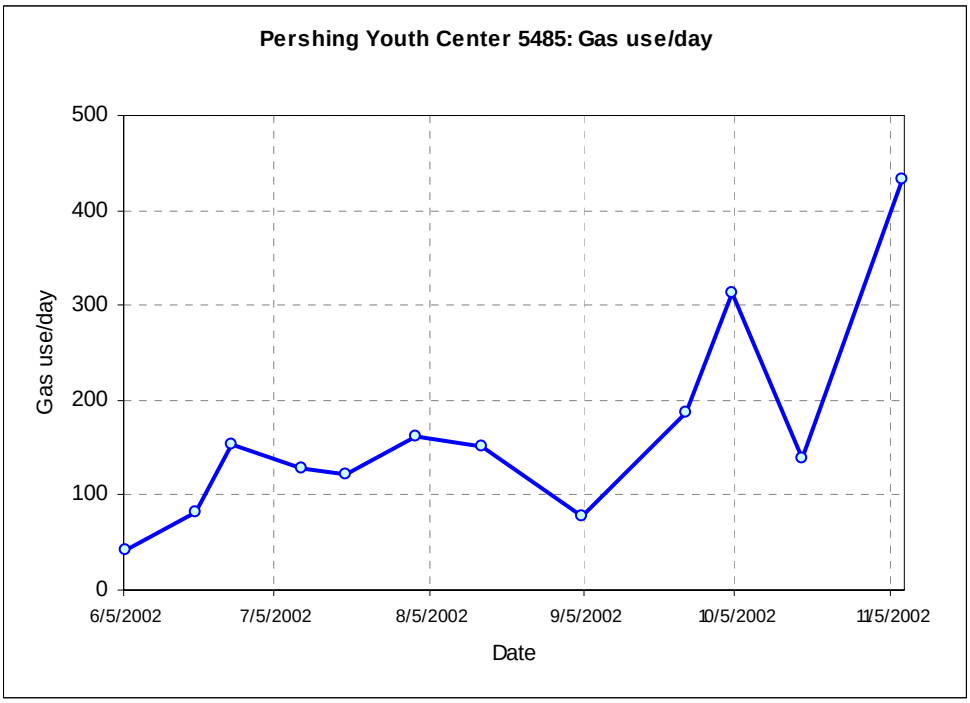
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 9
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

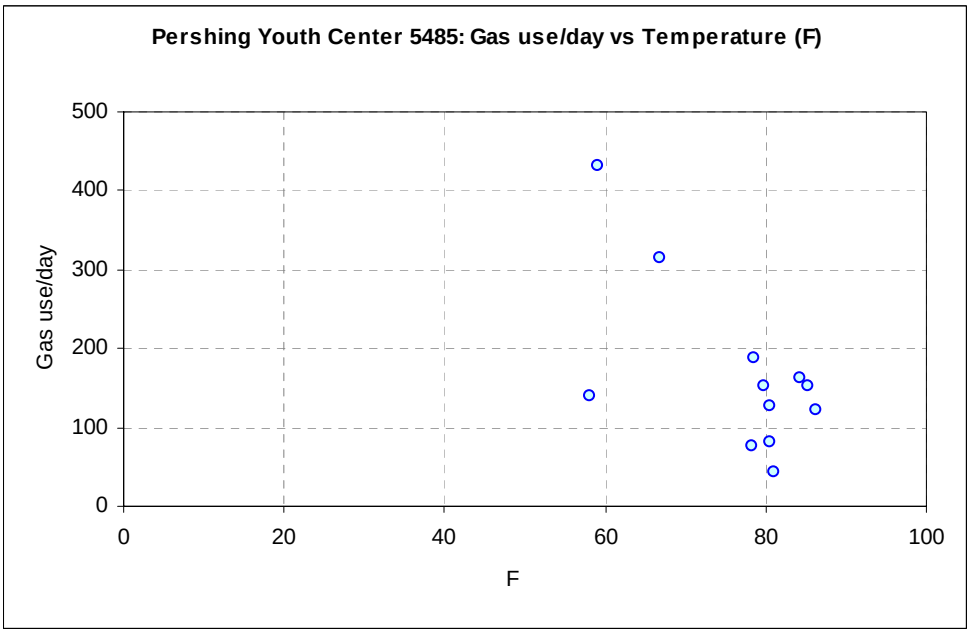
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =    9
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     12
       Ymean =   789.250
      StdDev =   578.799
    CV-StDev =    73.335 %
```


Pershing Youth Center 5485: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.5.2. Natural Gas From Manual Readings

5485 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1		
6/5/2002	37412	3120856	06/05/02	06/19/02	14	3120856	3121458	602	602	43	81.1
6/19/2002	37426	3121458	06/19/02	06/26/02	7	3121458	3122031	573	573	82	80.6
6/26/2002	37433	3122031	06/26/02	07/10/02	14	3122031	3124173	2142	2142	153	79.7
7/10/2002	37447	3124173	07/10/02	07/19/02	9	3124173	3125323	1150	1150	128	80.6
7/19/2002	37456	3125323	07/19/02	08/02/02	14	3125323	3127030	1707	1707	122	86.4
8/2/2002	37470	3127030	08/02/02	08/15/02	13	3127030	3129141	2111	2111	162	84.3
8/15/2002	37483	3129141	08/15/02	09/04/02	20	3129141	3132167	3026	3026	151	85.4
9/4/2002	37503	3132167	09/04/02	09/25/02	21	3132167	3133783	1616	1616	77	78.2
9/25/2002	37524	3133783	09/25/02	10/04/02	9	3133783	3135468	1685	1685	187	78.7
10/4/2002	37533	3135468	10/04/02	10/18/02	14	3135468	3139860	4392	4392	314	66.9
10/18/2002	37547	3139860	10/18/02	11/07/02	20	3139860	3142650	2790	2790	140	58.1
11/7/2002	37567	3142650	11/07/02	11/19/02	12	3142650	3147836	5186	5186	432	59.1
11/19/2002	37579	3147836	11/19/02	01/00/00	-37579	3147836	0	-3E+06	-3E+06	84	0.0

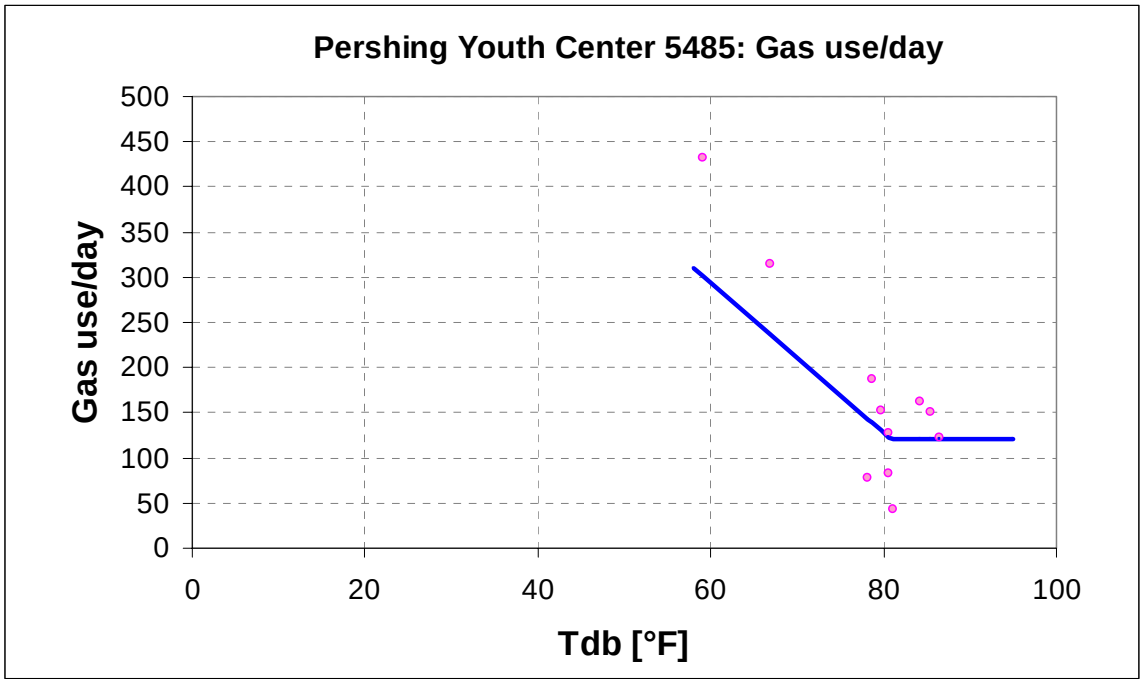

Pershing Youth Center 5485: Gas use/day
Gas use/day
500
400
300
200
100
0
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Pershing Youth Center 5485: Gas use/day vs Temperature (F)
Gas use/day
500
400
300
200
100
0
0
20
40
60
80
100
F

12.3.5.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 10
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

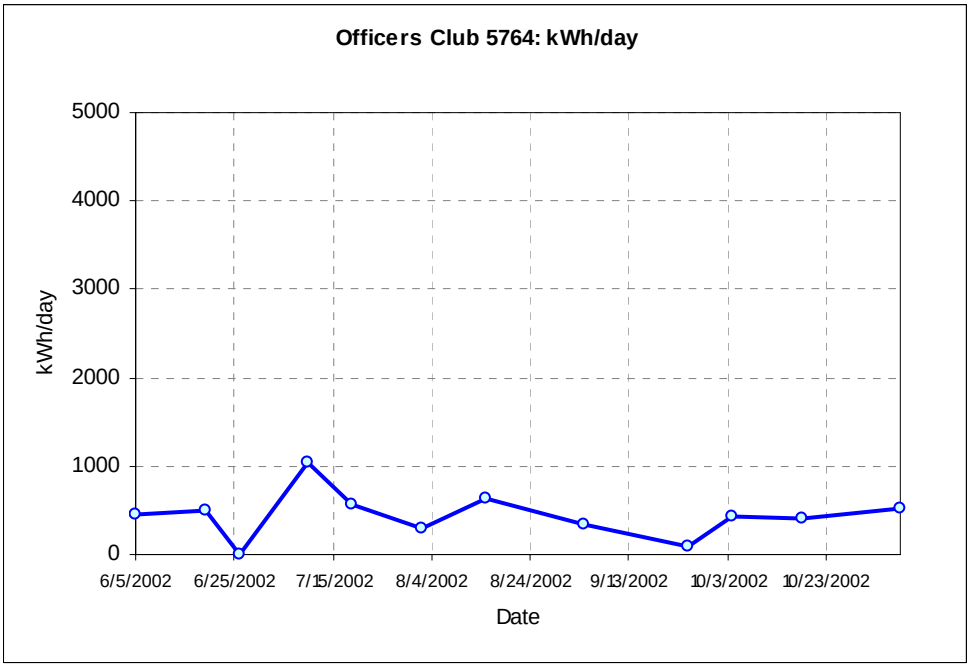
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           3P Heating
    Grouping column No =    4
    Value for grouping =   10
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   3
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     12
          R2 =     0.456
       AdjR2 =     0.456
        RMSE =     83.3039
     CV-RMSE =    50.208%
           p =    -0.523
          DW =     2.619 (p>0)
          N1 =      8
          N2 =      4
         Ycp =    121.5480 (     28.5081)
          LS =     -8.3165 (      2.8698)
          RS =      0.0000 (      0.0000)
         Xcp =     80.7400 (      0.5660)
```

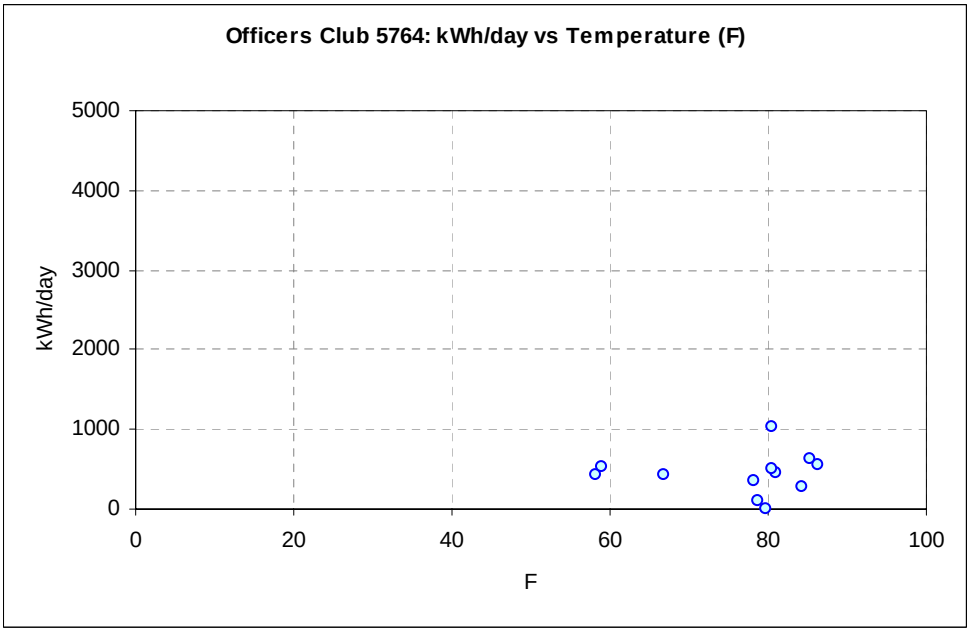

Pershing Youth Center 5485: Gas use/day
Gas use/day
500
450
400
350
300
250
200
150
100
50
0
0
20
40
60
80
100
Tdb [°F]

12.3.6. 5764 Officers Club

12.3.6.1. Electricity Use From Manual Readings

5764 Elec 1		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									160	1031	
6/5/2002	37412	7100	6/5/2002	6/19/2002	14	7100	7139	39	6240	446	81.1
6/19/2002	37426	7139	6/19/2002	6/26/2002	7	7139	7161	22	3520	503	80.6
6/26/2002	37433	7161	6/26/2002	7/10/2002	14	7161	7161	0	0	0	79.7
7/10/2002	37447	7161	7/10/2002	7/19/2002	9	7161	7219	58	9280	1031	80.6
7/19/2002	37456	7219	7/19/2002	8/2/2002	14	7219	7268	49	7840	560	86.4
8/2/2002	37470	7268	8/2/2002	8/15/2002	13	7268	7291	23	3680	283	84.3
8/15/2002	37483	7291	8/15/2002	9/4/2002	20	7291	7371	80	12800	640	85.4
9/4/2002	37503	7371	9/4/2002	9/25/2002	21	7371	7416	45	7200	343	78.2
9/25/2002	37524	7416	9/25/2002	10/4/2002	9	7416	7421	5	800	89	78.7
10/4/2002	37533	7421	10/4/2002	10/18/2002	14	7421	7458	37	5920	423	66.9
10/18/2002	37547	7458	10/18/2002	11/7/2002	20	7458	7510	52	8320	416	58.1
11/7/2002	37567	7510	11/7/2002	11/19/2002	12	7510	7549	39	6240	520	59.1
11/19/2002	37579	7549	11/19/2002	1/0/1900	####	7549	0	-7549	-1E+06	32	

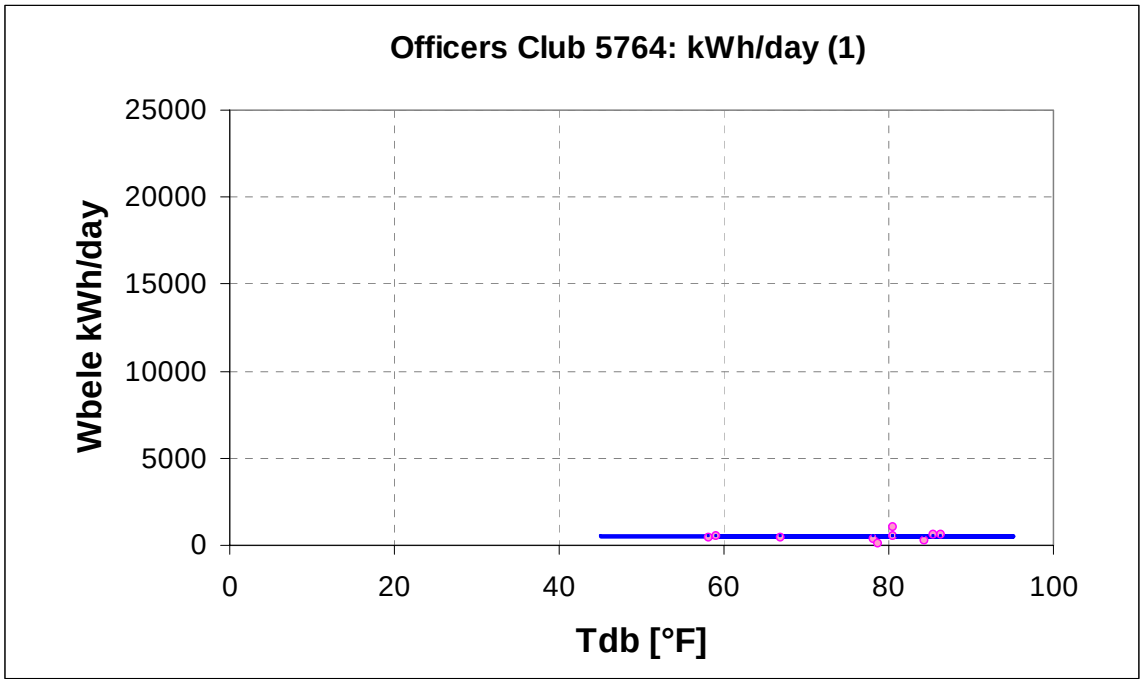

Officers Club 5764: kWh/day
5000
4000
3000
2000
1000
0
kWh/day
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date


Officers Club 5764: kWh/day vs Temperature (F)
5000
4000
3000
2000
1000
0
kWh/day
0
20
40
60
80
100
F

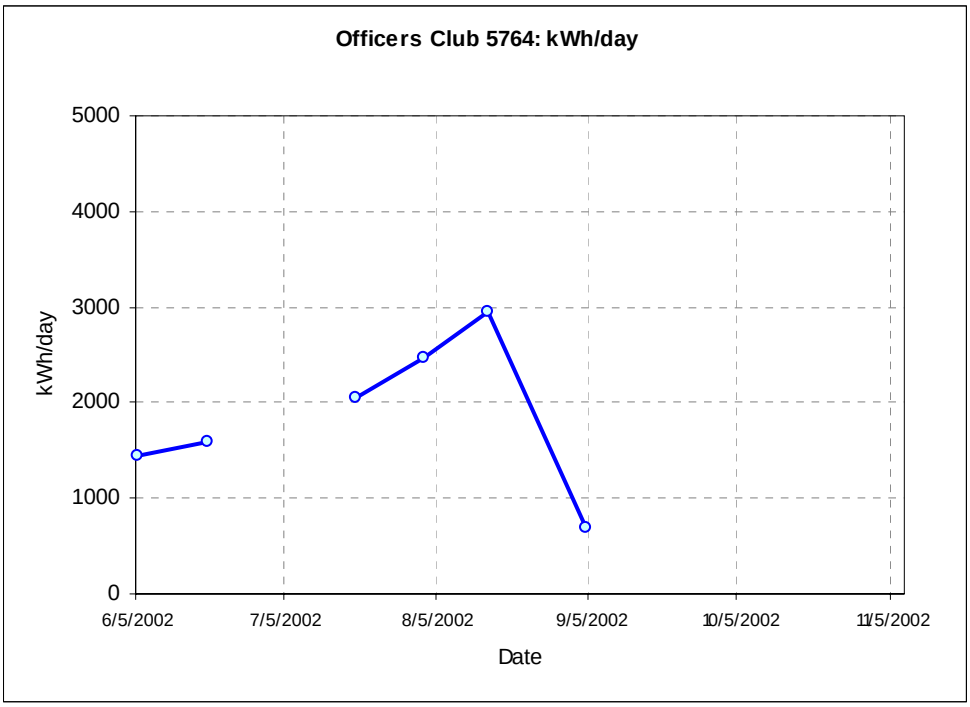
12.3.6.1.1. Baseline Model From Manual Readings

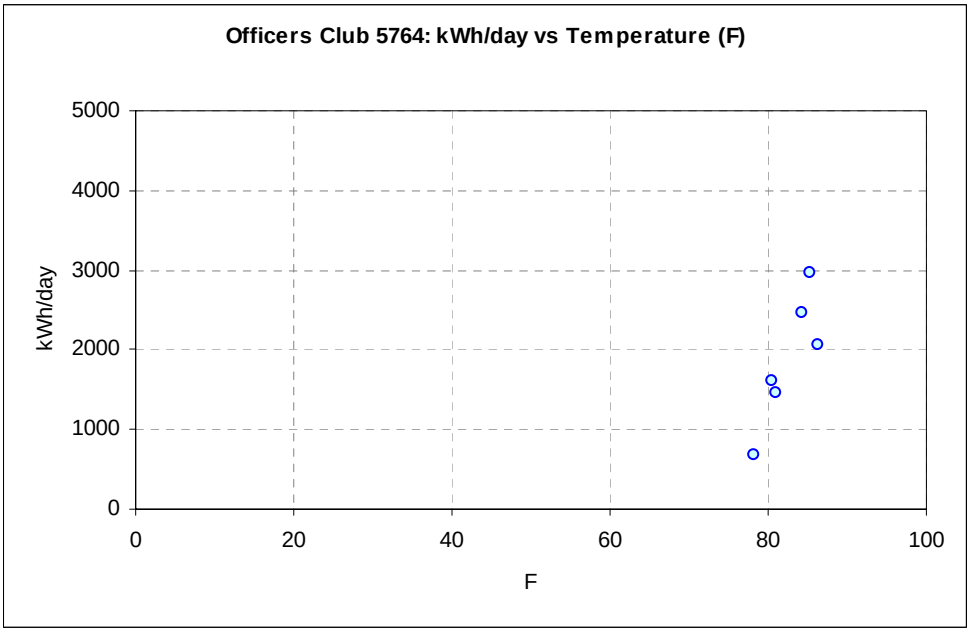
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 11
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   11
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     11
       Ymean =   477.636
      StdDev =   235.930
    CV-StDev =    49.395 %
```


Officers Club 5764: kWh/day (1)
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

5764 Elec 2		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F
									160	2960	
6/5/2002	37412	154	6/5/2002	6/19/2002	14	154	281	127	20320	1451	81.
6/19/2002	37426	281	6/19/2002	6/26/2002	7	281	351	70	11200	1600	80.
6/26/2002	37433	351	6/26/2002	7/10/2002	14	351	Water	#VALUE!	#VALUE!		79.
7/10/2002	37447	Water	7/10/2002	7/19/2002	9	Water	601	#VALUE!	#VALUE!		80.
7/19/2002	37456	601	7/19/2002	8/2/2002	14	601	781	180	28800	2057	86.
8/2/2002	37470	781	8/2/2002	8/15/2002	13	781	981	200	32000	2462	84.
8/15/2002	37483	981	8/15/2002	9/4/2002	20	981	1351	370	59200	2960	85.
9/4/2002	37503	1351	9/4/2002	9/25/2002	21	1351	1441	90	14400	686	78.
9/25/2002	37524	1441	9/25/2002	10/4/2002	9	1441	broke	#VALUE!	#VALUE!		78.
10/4/2002	37533	broke	10/4/2002	10/18/2002	14	broke	broke	#VALUE!	#VALUE!		66.
10/18/2002	37547	broke	10/18/2002	11/7/2002	20	broke	broke	#VALUE!	#VALUE!		58.
11/7/2002	37567	broke	11/7/2002	11/19/2002	12	broke	broke	#VALUE!	#VALUE!		59.
11/19/2002	37579	broke	11/19/2002	1/0/1900	#####	broke	0	#VALUE!	#VALUE!		0.

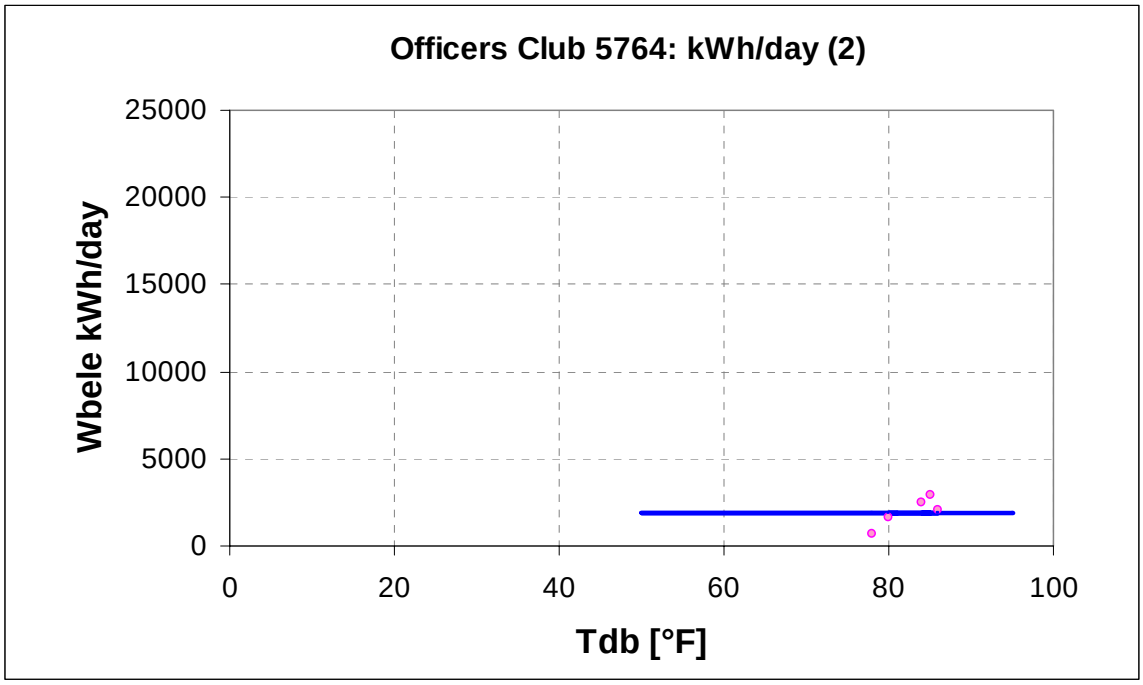

Officers Club 5764: kWh/day
5000
4000
3000
2000
1000
0
kWh/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Officers Club 5764: kWh/day vs Temperature (F)
5000
4000
3000
2000
1000
0
kWh/day
0
20
40
60
80
100
F

12.3.6.1.2. Baseline Model From Manual Readings

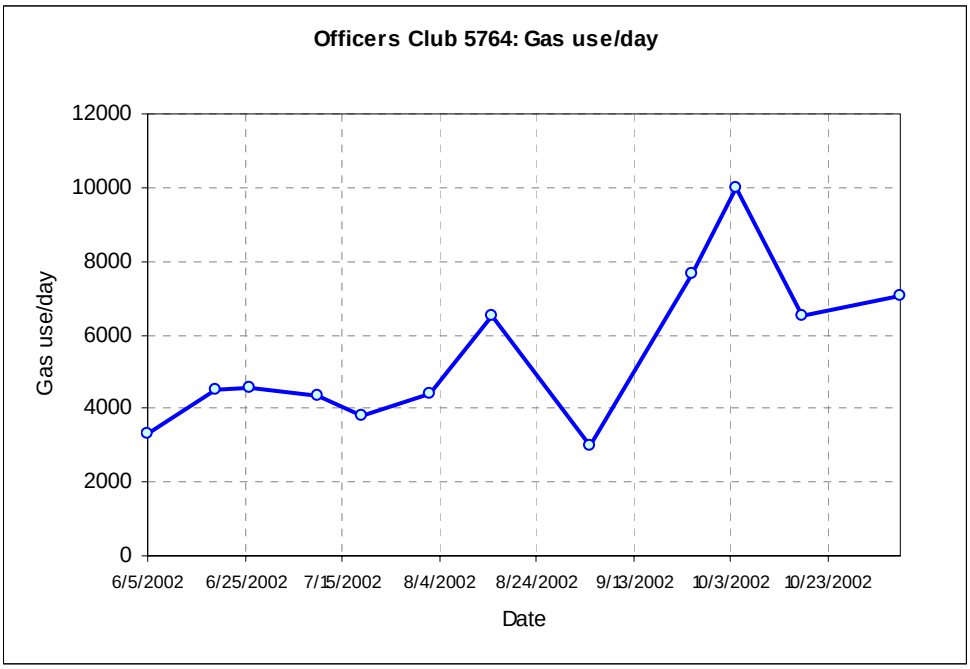
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 11
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =2
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

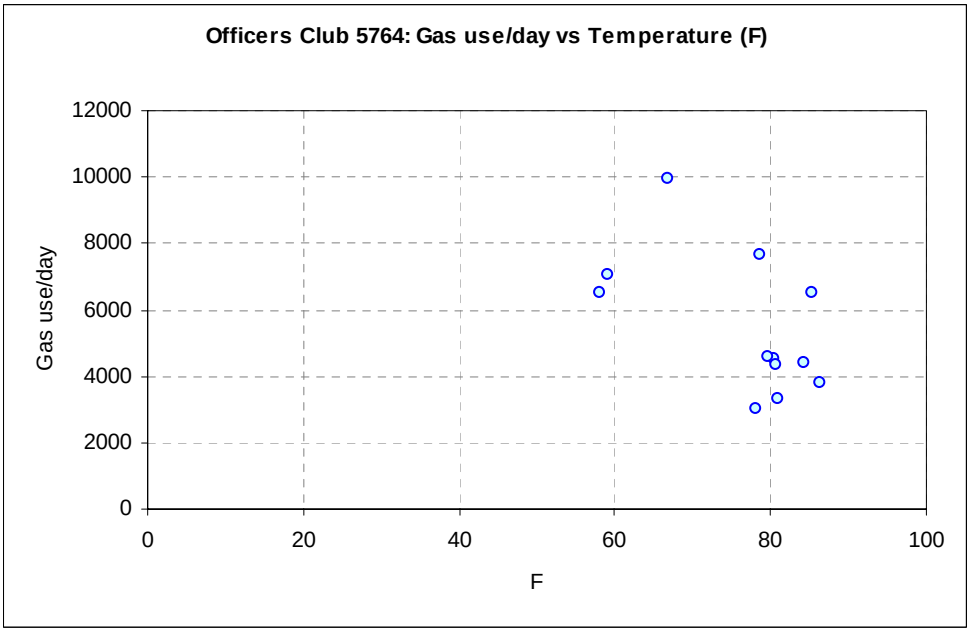
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   11
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      2
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =      6
   ------------------------------------
       Ymean =  1869.333
   ------------------------------------
      StdDev =   802.975
   ------------------------------------
    CV-StDev =    42.955 %
   ------------------------------------
```


Officers Club 5764: kWh/day (2)
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.6.2. Natural Gas From Manual Readings

5764 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1		
6/5/2002	37412	3012170	6/5/2002	6/19/2002	14	3012170	3058766	46596	46596	3328	81.1
6/19/2002	37426	3058766	6/19/2002	6/26/2002	7	3058766	3090294	31528	31528	4504	80.6
6/26/2002	37433	3090294	6/26/2002	7/10/2002	14	3090294	3154351	64057	64057	4576	79.7
7/10/2002	37447	3154351	7/10/2002	7/19/2002	9	3154351	3193645	39294	39294	4366	80.6
7/19/2002	37456	3193645	7/19/2002	8/2/2002	14	3193645	3247035	53390	53390	3814	86.4
8/2/2002	37470	3247035	8/2/2002	8/15/2002	13	3247035	3303991	56956	56956	4381	84.3
8/15/2002	37483	3303991	8/15/2002	9/4/2002	20	3303991	3434082	130091	130091	6505	85.4
9/4/2002	37503	3434082	9/4/2002	9/25/2002	21	3434082	3496831	62749	62749	2988	78.2
9/25/2002	37524	3496831	9/25/2002	10/4/2002	9	3496831	3565928	69097	69097	7677	78.7
10/4/2002	37533	3565928	10/4/2002	10/18/2002	14	3565928	3705479	139551	139551	9968	66.9
10/18/2002	37547	3705479	10/18/2002	11/7/2002	20	3705479	3836176	130697	130697	6535	58.1
11/7/2002	37567	3836176	11/7/2002	11/19/2002	12	3836176	3920808	84632	84632	7053	59.1
11/19/2002	37579	3920808									

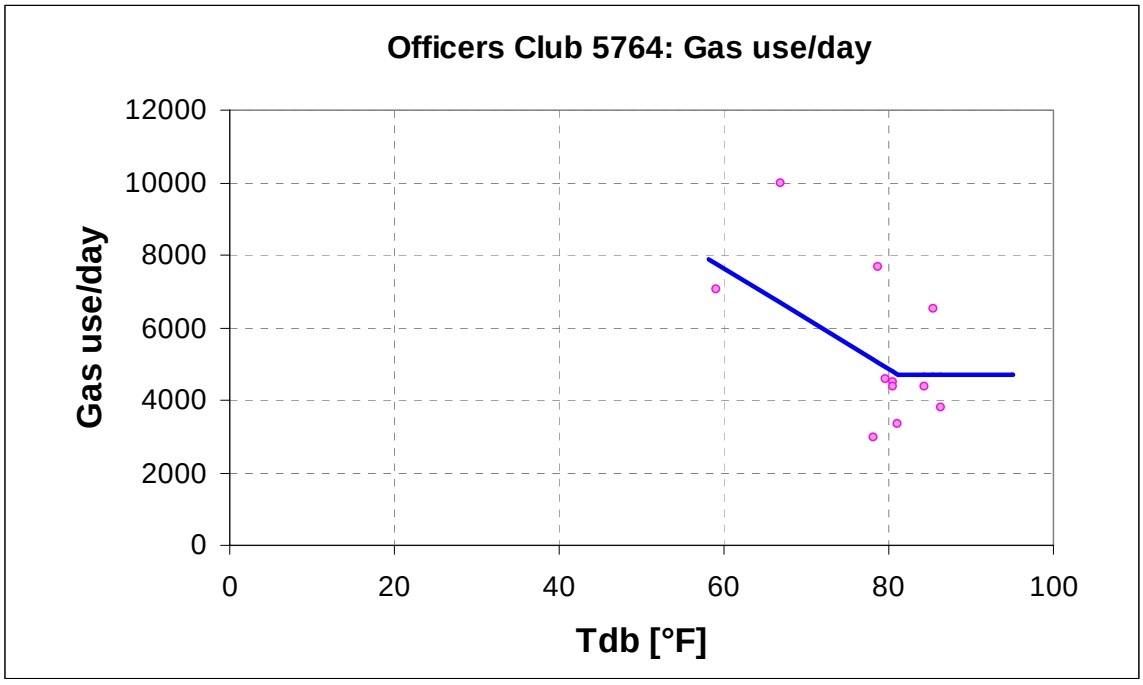

Officers Club 5764: Gas use/day
Gas use/day
12000
10000
8000
6000
4000
2000
0
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date


Officers Club 5764: Gas use/day vs Temperature (F)
Gas use/day
12000
10000
8000
6000
4000
2000
0
0
20
40
60
80
100
F

12.3.6.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 12
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

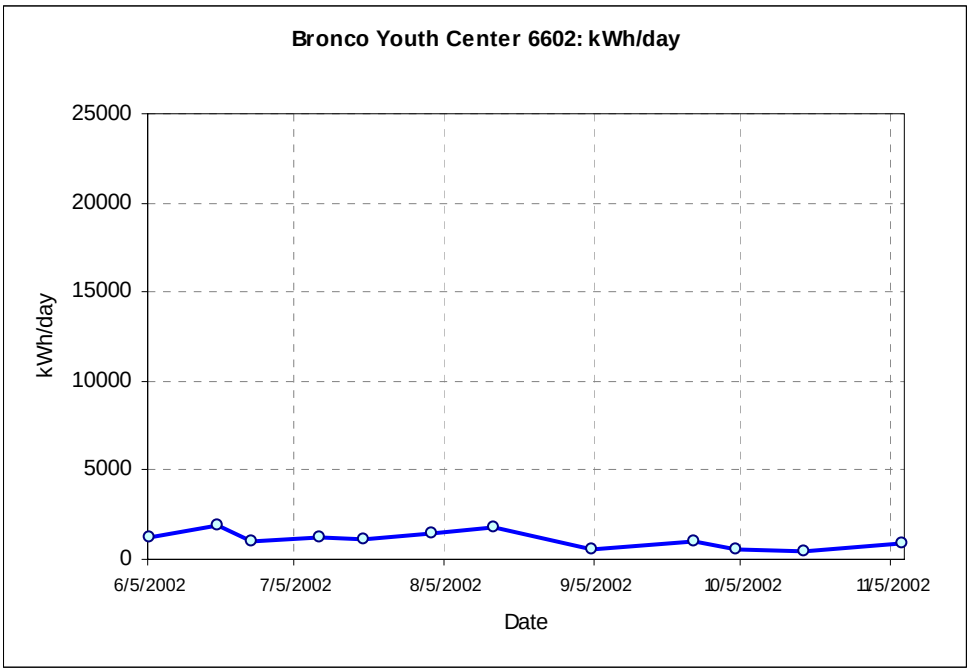
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           3P Heating
    Grouping column No =    4
    Value for grouping =   12
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   3
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     12
          R2 =     0.345
       AdjR2 =     0.345
        RMSE =   1762.4287
     CV-RMSE =    32.193%
           p =    -0.123
          DW =     2.154 (p>0)
          N1 =      9
          N2 =      3
         Ycp =   4686.2710 (    613.7485)
          LS =   -137.5881 (     59.9144)
          RS =      0.0000 (      0.0000)
         Xcp =     81.3060 (      0.5660)
```

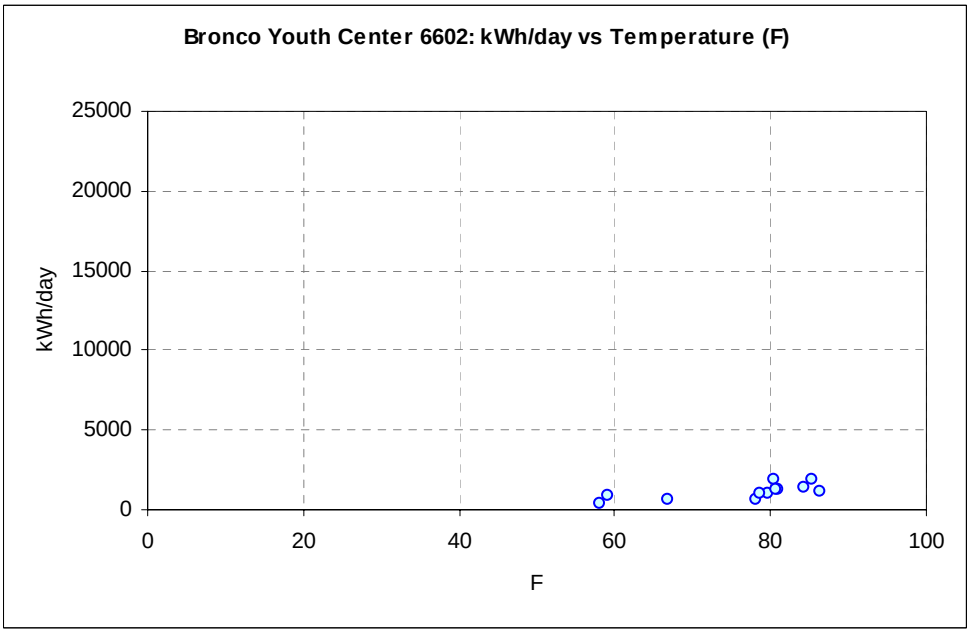

Officers Club 5764: Gas use/day
Gas use/day
12000
10000
8000
6000
4000
2000
0
0
20
40
60
80
100
Tdb [°F]

12.3.7. 6602 Bronco Youth Center

12.3.7.1. Electricity Use From Manual Readings

6602 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									80	1943	
6/5/2002	37412	28738	6/5/2002	6/19/2002	14	28738	28960	222	17760	1269	81.1
6/19/2002	37426	28960	6/19/2002	6/26/2002	7	28960	29130	170	13600	1943	80.6
6/26/2002	37433	29130	6/26/2002	7/10/2002	14	29130	29300	170	13600	971	79.7
7/10/2002	37447	29300	7/10/2002	7/19/2002	9	29300	29444	144	11520	1280	80.6
7/19/2002	37456	29444	7/19/2002	8/2/2002	14	29444	29635	191	15280	1091	86.4
8/2/2002	37470	29635	8/2/2002	8/15/2002	13	29635	29863	228	18240	1403	84.3
8/15/2002	37483	29863	8/15/2002	9/4/2002	20	29863	30319	456	36480	1824	85.4
9/4/2002	37503	30319	9/4/2002	9/25/2002	21	30319	30477	158	12640	602	78.2
9/25/2002	37524	30477	9/25/2002	10/4/2002	9	30477	30588	111	8880	987	78.7
10/4/2002	37533	30588	10/4/2002	10/18/2002	14	30588	30690	102	8160	583	66.9
10/18/2002	37547	30690	10/18/2002	11/7/2002	20	30690	30799	109	8720	436	58.1
11/7/2002	37567	30799	11/7/2002	11/19/2002	12	30799	30939	140	11200	933	59.1
11/19/2002	37579	30939	11/19/2002	1/0/1900	#####	30939	0	-30939	-2E+06	66	0.0

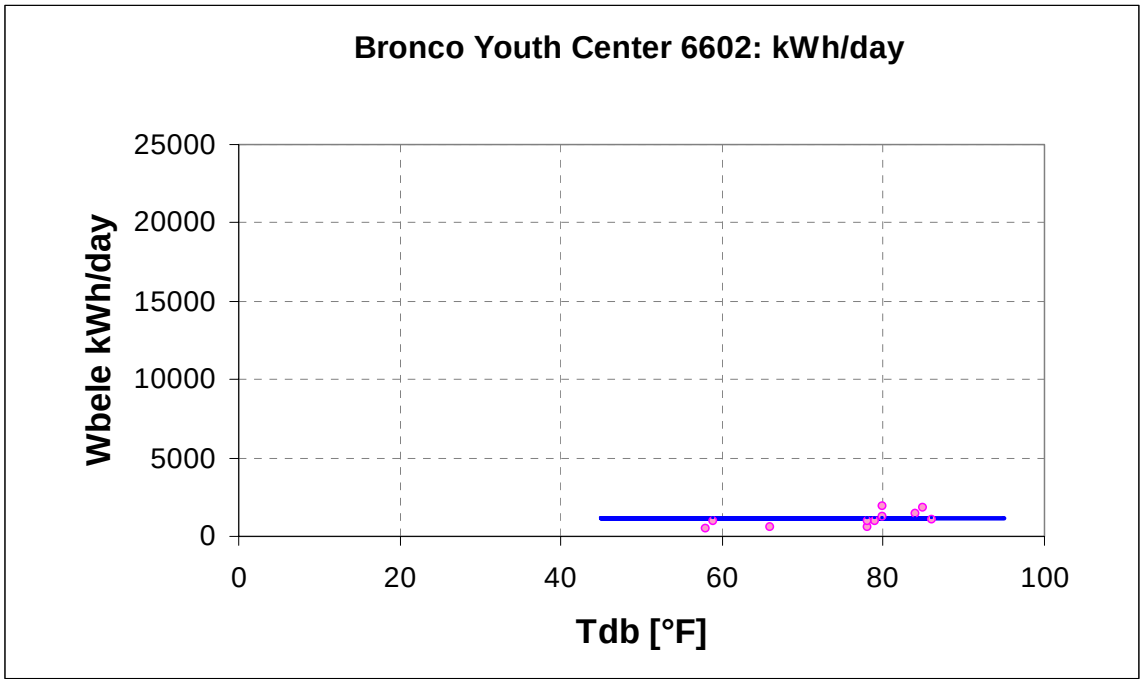

Bronco Youth Center 6602: kWh/day
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Bronco Youth Center 6602: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
F

12.3.7.1.1. Baseline Model From Manual Readings

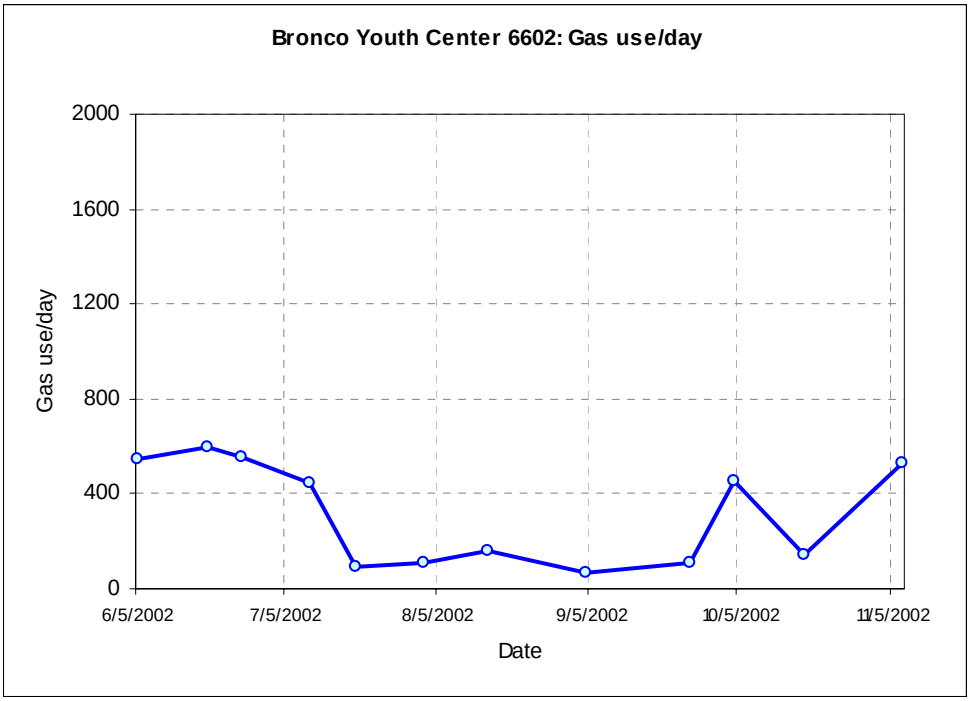
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 13
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

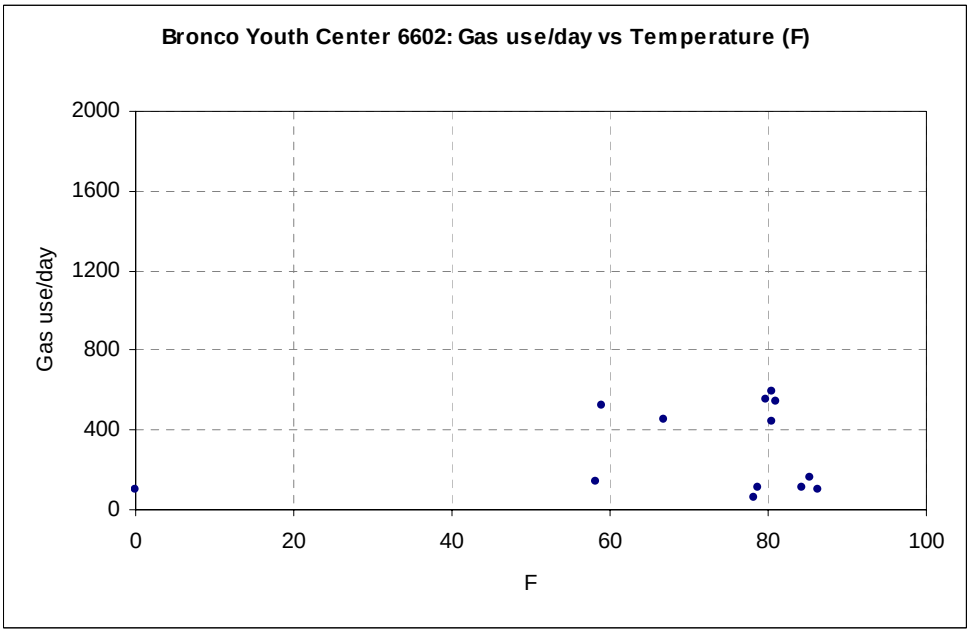
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   13
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     12
   ------------------------------------
       Ymean =  1110.167
   ------------------------------------
      StdDev =   467.092
   ------------------------------------
    CV-StDev =    42.074 %
   ------------------------------------
```


Bronco Youth Center 6602: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.7.2. Natural Gas From Manual Readings

6602 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1		
6/5/2002	37412	3731774	6/5/2002	6/19/2002	14	3731774	3739379	7605	7605	543	81.1
6/19/2002	37426	3739379	6/19/2002	6/26/2002	7	3739379	3743544	4165	4165	595	80.6
6/26/2002	37433	3743544	6/26/2002	7/10/2002	14	3743544	3751275	7731	7731	552	79.7
7/10/2002	37447	3751275	7/10/2002	7/19/2002	9	3751275	3755271	3996	3996	444	80.6
7/19/2002	37456	3755271	7/19/2002	8/2/2002	14	3755271	3756615	1344	1344	96	86.4
8/2/2002	37470	3756615	8/2/2002	8/15/2002	13	3756615	3758080	1465	1465	113	84.3
8/15/2002	37483	3758080	8/15/2002	9/4/2002	20	3758080	3761196	3116	3116	156	85.4
9/4/2002	37503	3761196	9/4/2002	9/25/2002	21	3761196	3762550	1354	1354	64	78.2
9/25/2002	37524	3762550	9/25/2002	10/4/2002	9	3762550	3763516	966	966	107	78.7
10/4/2002	37533	3763516	10/4/2002	10/18/2002	14	3763516	3769812	6296	6296	450	66.9
10/18/2002	37547	3769812	10/18/2002	11/7/2002	20	3769812	3772698	2886	2886	144	58.1
11/7/2002	37567	3772698	11/7/2002	11/19/2002	12	3772698	3779007	6309	6309	526	59.1
11/19/2002	37579	3779007	11/19/2002	1/0/1900	####	3779007	0	-4E+06	-4E+06	101	0.0

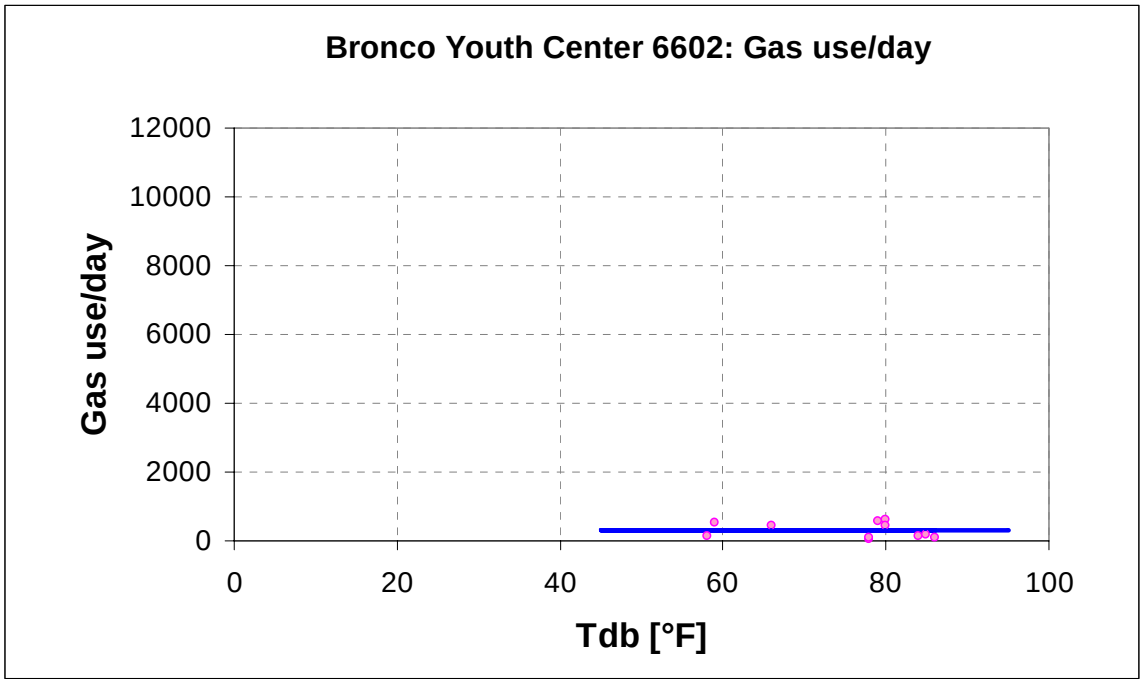

Bronco Youth Center 6602: Gas use/day
2000
1600
1200
800
400
0
Gas use/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Bronco Youth Center 6602: Gas use/day vs Temperature (F)
2000
1600
1200
800
400
0
Gas use/day
0
20
40
60
80
100
F

12.3.7.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 14
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

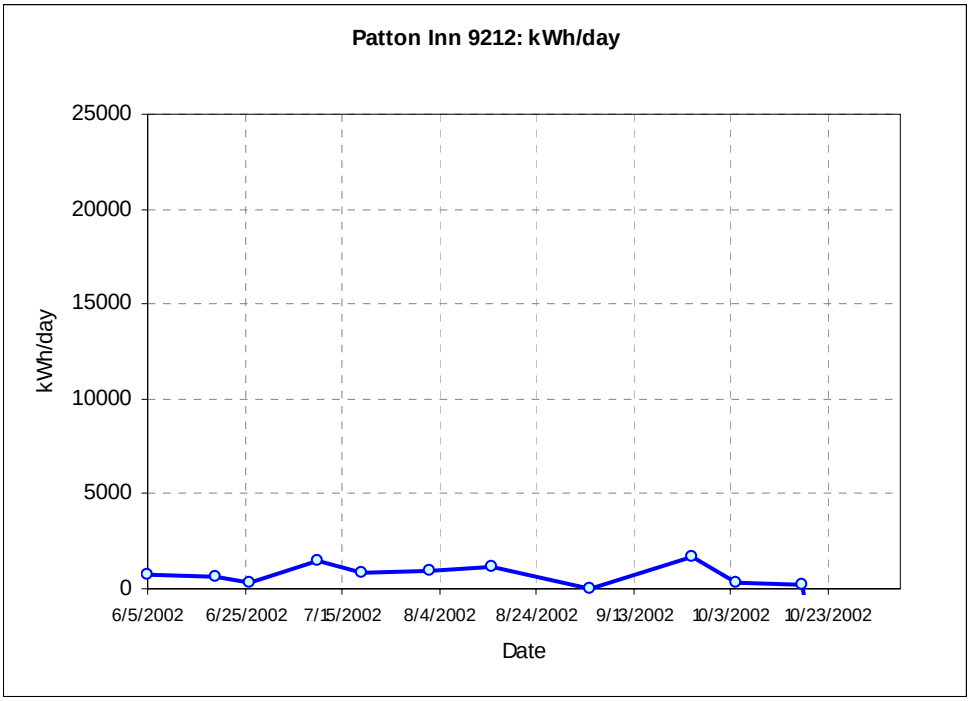
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   14
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   -------------------------------------
           N =     12
   -------------------------------------
       Ymean =   315.833
   -------------------------------------
      StdDev =   216.477
   -------------------------------------
    CV-StDev =    68.541 %
   -------------------------------------
```

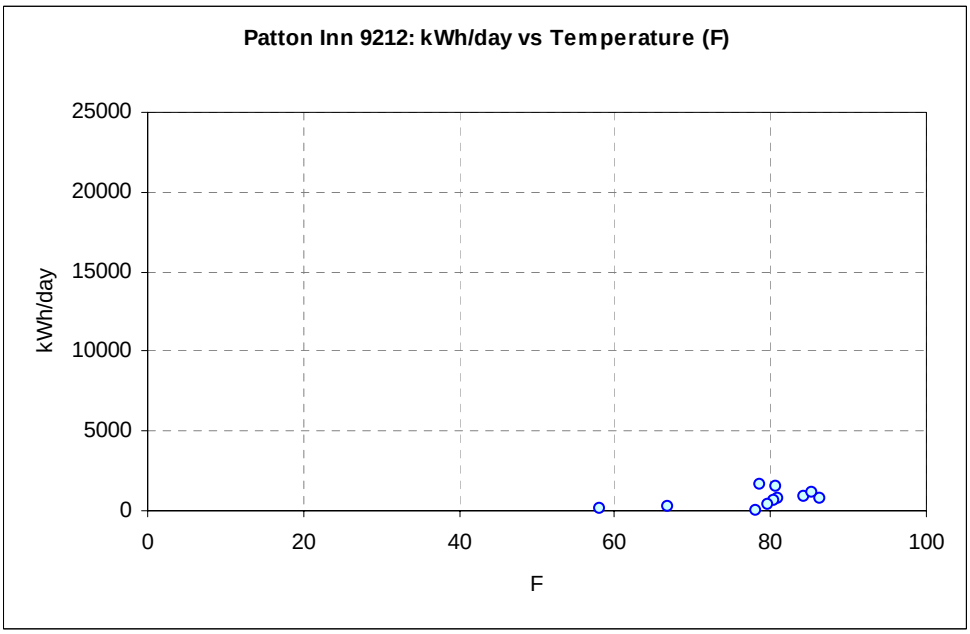

Bronco Youth Center 6602: Gas use/day
Gas use/day
12000
10000
8000
6000
4000
2000
0
0
20
40
60
80
100
Tdb [°F]

12.3.8. 9212 Patton Inn

12.3.8.1. Electricity Use From Manual Readings

9212 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									40	1644	
6/5/2002	37412	7388	6/5/2002	6/19/2002	14	7388	7633	245	9800	700	81.1
6/19/2002	37426	7633	6/19/2002	6/26/2002	7	7633	7740	107	4280	611	80.6
6/26/2002	37433	7740	6/26/2002	7/10/2002	14	7740	7859	119	4760	340	79.7
7/10/2002	37447	7859	7/10/2002	7/19/2002	9	7859	8195	336	13440	1493	80.6
7/19/2002	37456	8195	7/19/2002	8/2/2002	14	8195	8472	277	11080	791	86.4
8/2/2002	37470	8472	8/2/2002	8/15/2002	13	8472	8771	299	11960	920	84.3
8/15/2002	37483	8771	8/15/2002	9/4/2002	20	8771	9366	595	23800	1190	85.4
9/4/2002	37503	9366	9/4/2002	9/25/2002	21	9366	9380	14	560	27	78.2
9/25/2002	37524	9380	9/25/2002	10/4/2002	9	9380	9750	370	14800	1644	78.7
10/4/2002	37533	9750	10/4/2002	10/18/2002	14	9750	9856	106	4240	303	66.9
10/18/2002	37547	9856	10/18/2002	11/7/2002	20	9856	9935	79	3160	158	58.1
11/7/2002	37567	9935	11/7/2002	11/19/2002	12	9935	214	-9721	-388840	-32403	59.1
11/19/2002	37579	214	11/19/2002	1/0/1900	####	214	0	-214	-8560	0	0.0


Patton Inn 9212: kWh/day
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date

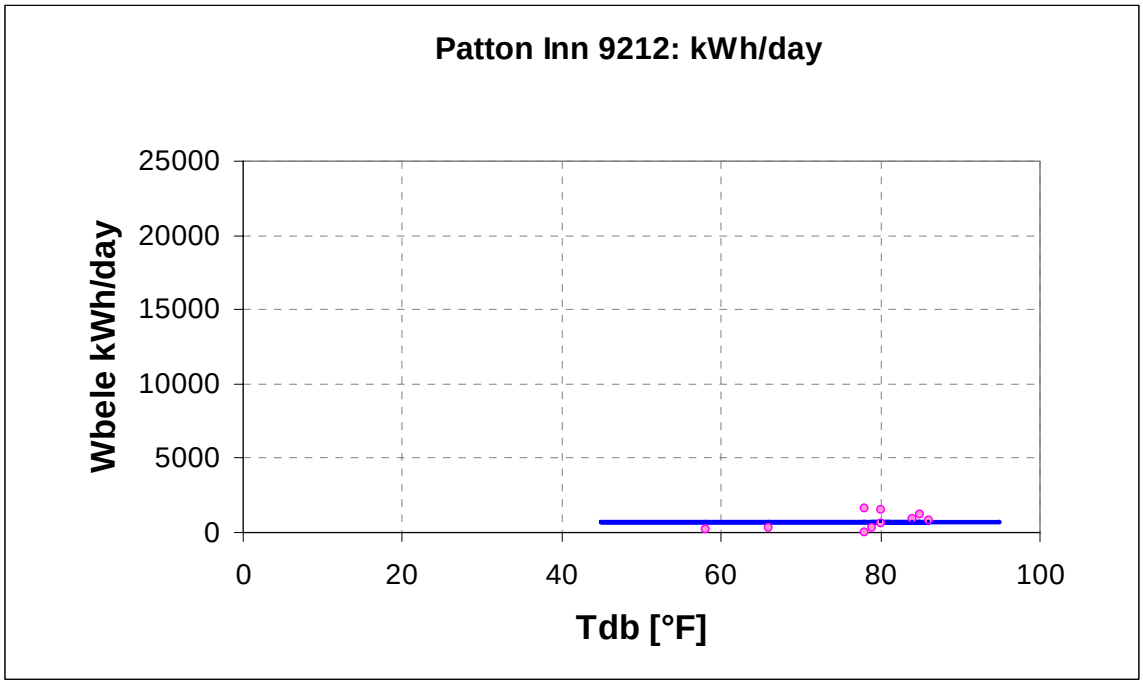

Patton Inn 9212: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
F

12.3.8.1.1. Baseline Model From Manual Readings

Patton Inn 9212

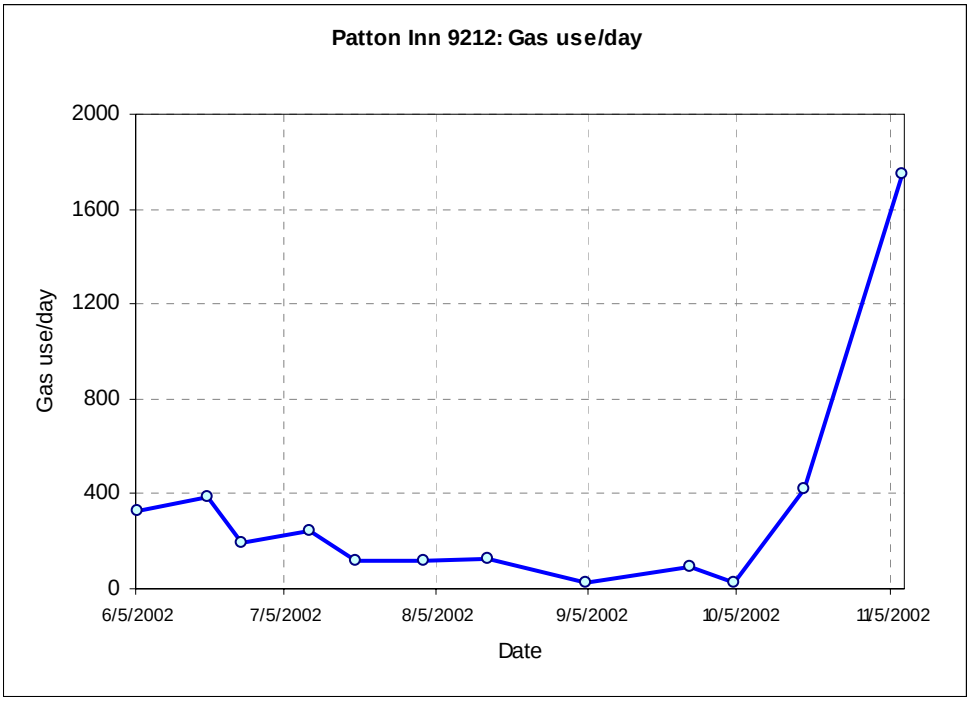
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 15
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

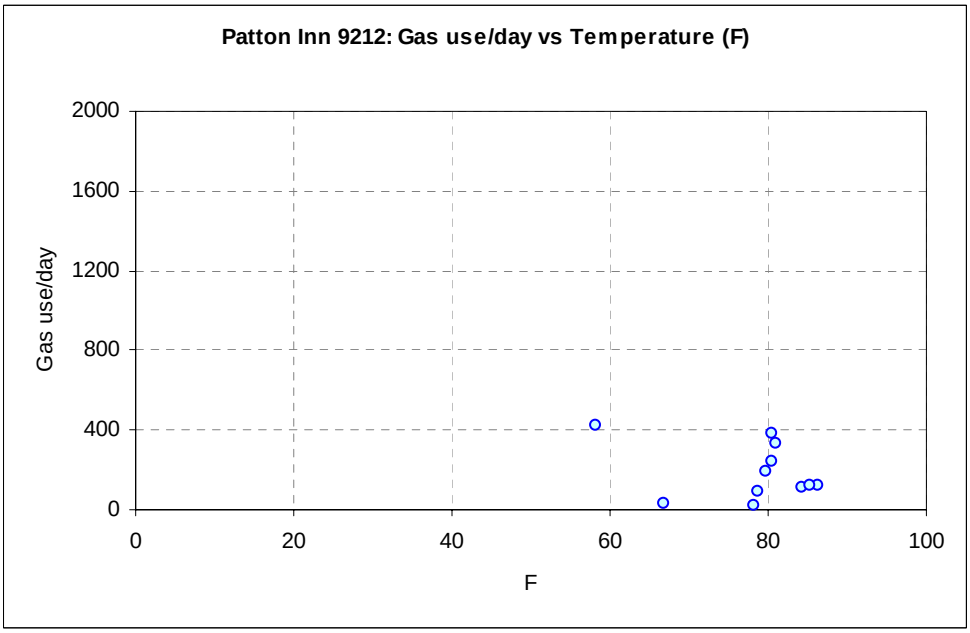
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   15
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     11
   ------------------------------------
       Ymean =   743.364
   ------------------------------------
      StdDev =   532.720
   ------------------------------------
    CV-StDev =    71.663 %
   ------------------------------------
```


Patton Inn 9212: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.8.2. Natural Gas From Manual Readings

9212 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									100		
6/5/2002	37412	9076	6/5/2002	6/19/2002	14	9076	9122	46	4600	329	81.1
6/19/2002	37426	9122	6/19/2002	6/26/2002	7	9122	9149	27	2700	386	80.6
6/26/2002	37433	9149	6/26/2002	7/10/2002	14	9149	9176	27	2700	193	79.7
7/10/2002	37447	9176	7/10/2002	7/19/2002	9	9176	9198	22	2200	244	80.6
7/19/2002	37456	9198	7/19/2002	8/2/2002	14	9198	9215	17	1700	121	86.4
8/2/2002	37470	9215	8/2/2002	8/15/2002	13	9215	9230	15	1500	115	84.3
8/15/2002	37483	9230	8/15/2002	9/4/2002	20	9230	9255	25	2500	125	85.4
9/4/2002	37503	9255	9/4/2002	9/25/2002	21	9255	9260	5	500	24	78.2
9/25/2002	37524	9260	9/25/2002	10/4/2002	9	9260	9268	8	800	89	78.7
10/4/2002	37533	9268	10/4/2002	########	14	9268	9272	4	400	29	66.9
10/18/2002	37547	9272	########	11/7/2002	20	9272	9356	84	8400	420	58.1
11/7/2002	37567	9356	11/7/2002	########	12	9356	9566	210	21000	1750	59.1
11/19/2002	37579	9566									

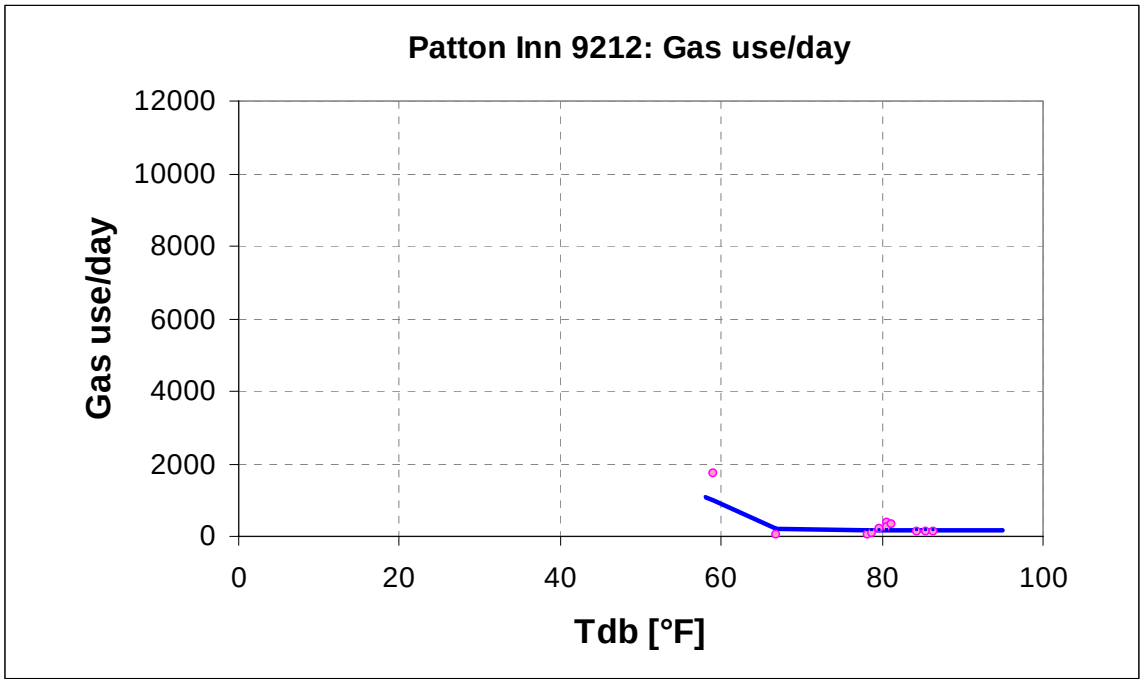

Patton Inn 9212: Gas use/day
2000
1600
1200
800
400
0
Gas use/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Patton Inn 9212: Gas use/day vs Temperature (F)
2000
1600
1200
800
400
0
Gas use/day
0
20
40
60
80
100
F

12.3.8.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 16
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

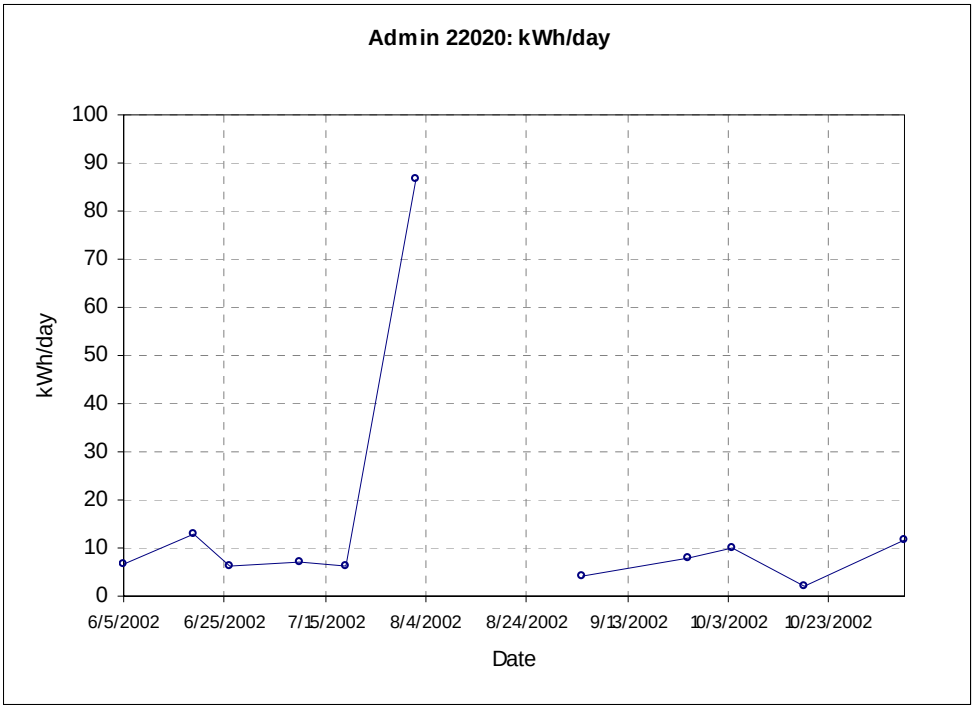
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           3P Heating
    Grouping column No =    4
    Value for grouping =   16
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   3
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     12
          R2 =     0.518
       AdjR2 =     0.518
        RMSE =    342.0592
     CV-RMSE =   107.313%
           p =    -0.281
          DW =     2.036 (p>0)
          N1 =      3
          N2 =      9
         Ycp =    171.7711 (    108.4529)
          LS =   -101.5516 (     30.9891)
          RS =      0.0000 (      0.0000)
         Xcp =     67.1560 (      0.5660)
```

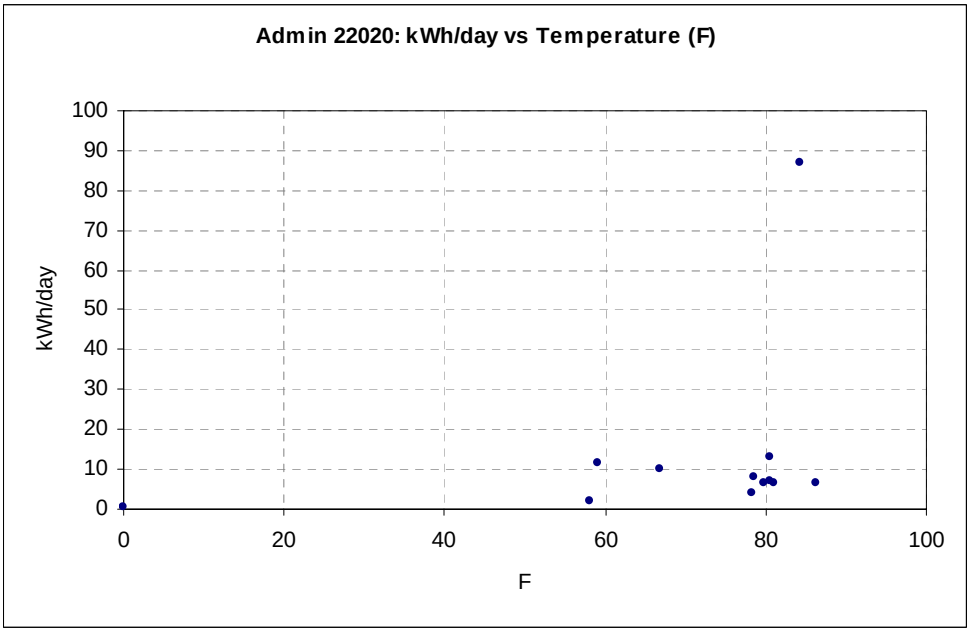

Patton Inn 9212: Gas use/day
Gas use/day
12000
10000
8000
6000
4000
2000
0
0
20
40
60
80
100
Tdb [°F]

12.3.9. 22020 Admin

12.3.9.1. Electricity Use From Manual Readings

22020 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F
									?	87	
6/5/2002	37412	20356	6/5/2002	6/19/2002	14	20356	20450	94		7	81
6/19/2002	37426	20450	6/19/2002	6/26/2002	7	20450	20541	91		13	80
6/26/2002	37433	20541	6/26/2002	7/10/2002	14	20541	20631	90		6	79
7/10/2002	37447	20631	7/10/2002	7/19/2002	9	20631	20694	63		7	80
7/19/2002	37456	20694	7/19/2002	8/2/2002	14	20694	20782	88		6	86
8/2/2002	37470	20782	8/2/2002	8/15/2002	13	20782	21910	1128		87	84
8/15/2002	37483	21910	8/15/2002	9/4/2002	20	21910	21097	-813			85
9/4/2002	37503	21097	9/4/2002	9/25/2002	21	21097	21185	88		4	78
9/25/2002	37524	21185	9/25/2002	10/4/2002	9	21185	21257	72		8	78
10/4/2002	37533	21257	10/4/2002	10/18/2002	14	21257	21398	141		10	66
10/18/2002	37547	21398	10/18/2002	11/7/2002	20	21398	21436	38		2	58
11/7/2002	37567	21436	11/7/2002	11/19/2002	12	21436	21576	140		12	59
11/19/2002	37579	21576	11/19/2002	1/0/1900	####	21576	0	-21576		1	0





12.3.9.1.1. Baseline Model From Manual Readings

No baseline model available for this site.

12.3.9.2. Natural Gas From Manual Readings

22020 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1		
6/5/2002	37412	3561730	6/5/2002	6/19/2002	14	3561730	3561730	0	0	0	81.1
6/19/2002	37426	3561730	6/19/2002	6/26/2002	7	3561730	3561730	0	0	0	80.6
6/26/2002	37433	3561730	6/26/2002	7/10/2002	14	3561730	3561730	0	0	0	79.7
7/10/2002	37447	3561730	7/10/2002	7/19/2002	9	3561730	3561730	0	0	0	80.6
7/19/2002	37456	3561730	7/19/2002	8/2/2002	14	3561730	3561730	0	0	0	86.4
8/2/2002	37470	3561730	8/2/2002	8/15/2002	13	3561730	3561730	0	0	0	84.3
8/15/2002	37483	3561730	8/15/2002	9/4/2002	20	3561730	3561730	0	0	0	85.4
9/4/2002	37503	3561730	9/4/2002	9/25/2002	21	3561730	3561720	-10	-10	0	78.2
9/25/2002	37524	3561720	9/25/2002	10/4/2002	9	3561720	3561731	11	11	1	78.7
10/4/2002	37533	3561731	10/4/2002	10/18/2002	14	3561731	broke	#VALUE!	#VALUE!	#####	66.9
10/18/2002	37547	broke	10/18/2002	11/7/2002	20	Broke	broke	#VALUE!	#VALUE!	#####	58.1
11/7/2002	37567	broke	11/7/2002	11/19/2002	12	Broke	broke	#VALUE!	#VALUE!	#####	59.1
11/19/2002	37579	broke	11/19/2002	1/0/1900	####	Broke	0	#VALUE!	#VALUE!	#####	0.0

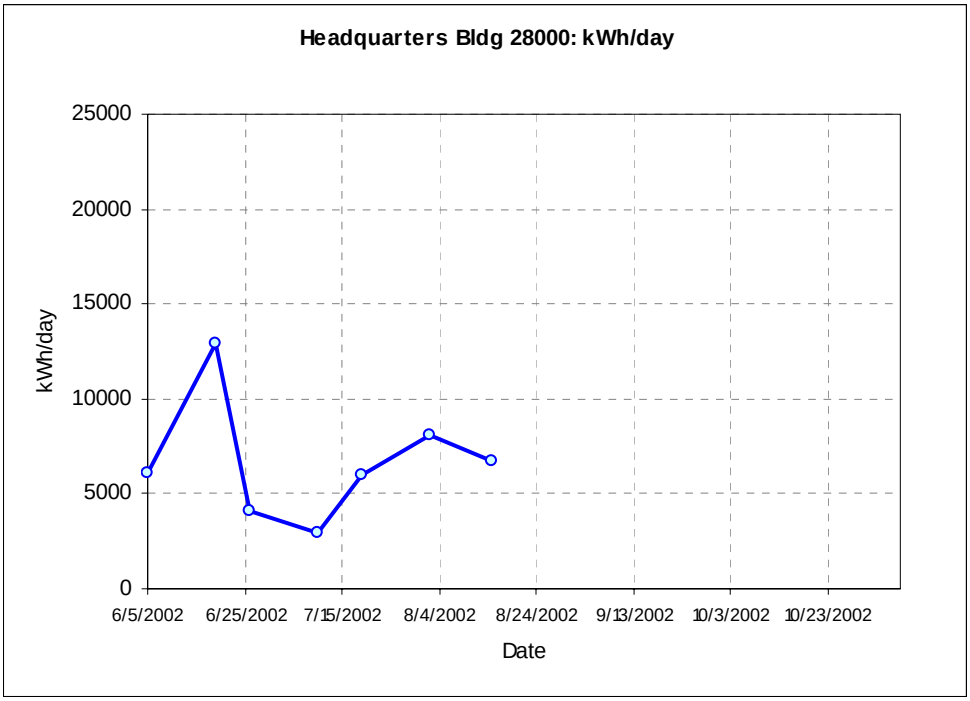
12.3.9.2.1. Baseline Model From Manual Readings

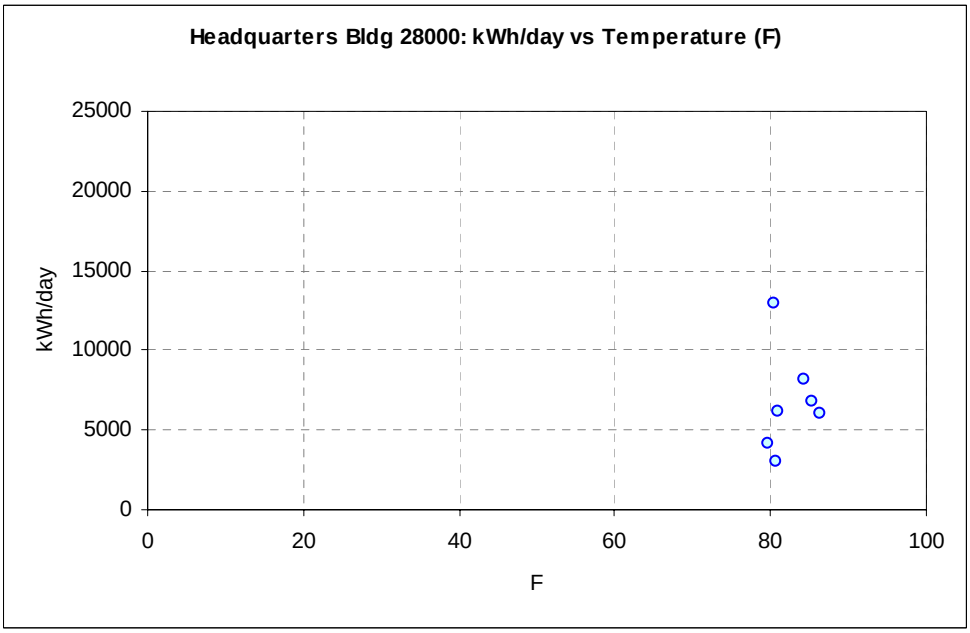
No baseline model available for this site.

12.3.10. 28000 Headquarters Bldg

12.3.10.1. Electricity Use From Manual Readings

28000 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F
									240	50829	
6/5/2002	37412	6456	6/5/2002	6/19/2002	14	6456	6813	357	85680	6120	81.
6/19/2002	37426	6813	6/19/2002	6/26/2002	7	6813	7190	377	90480	12926	80.
6/26/2002	37433	7190	6/26/2002	7/10/2002	14	7190	7430	240	57600	4114	79.
7/10/2002	37447	7430	7/10/2002	7/19/2002	9	7430	7541	111	26640	2960	80.
7/19/2002	37456	7541	7/19/2002	8/2/2002	14	7541	7893	352	84480	6034	86.
8/2/2002	37470	7893	8/2/2002	8/15/2002	13	7893	8333	440	105600	8123	84.
8/15/2002	37483	8333	8/15/2002	9/4/2002	20	8333	8896	563	135120	6756	85.
9/4/2002	37503	8896	9/4/2002	9/25/2002	21	8896	1168	-7728	-2E+06		78.
9/25/2002	37524	1168	9/25/2002	10/4/2002	9	1168	3021	1853	444720	49413	78.
10/4/2002	37533	3021	10/4/2002	10/18/2002	14	3021	5986	2965	711600	50829	66.
10/18/2002	37547	5986	10/18/2002	11/7/2002	20	5986	8561	2575	618000	30900	58.
11/7/2002	37567	8561	11/7/2002	11/19/2002	12	8561	255	-8306	-2E+06		59.
11/19/2002	37579	255	11/19/2002	1/0/1900	#####	255	0	-255	-61200	2	0.


Headquarters Bldg 28000: kWh/day
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date

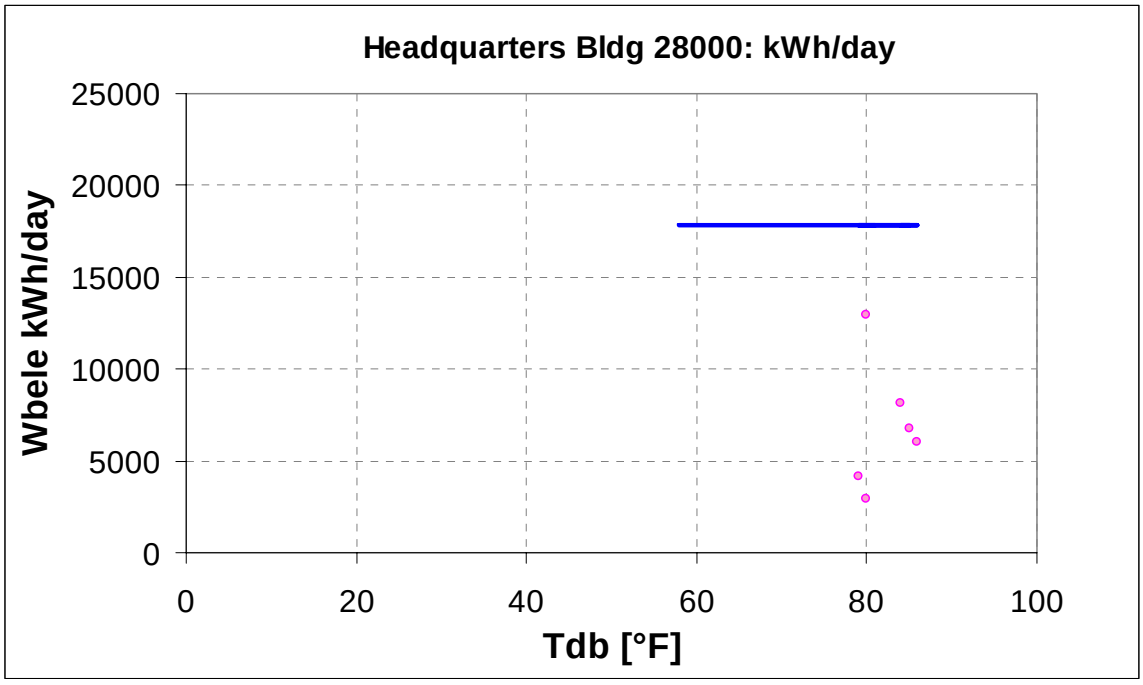

Headquarters Bldg 28000: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
F

12.3.10.1.1. Baseline Model From Manual Readings

Headquarters Bldg 28000

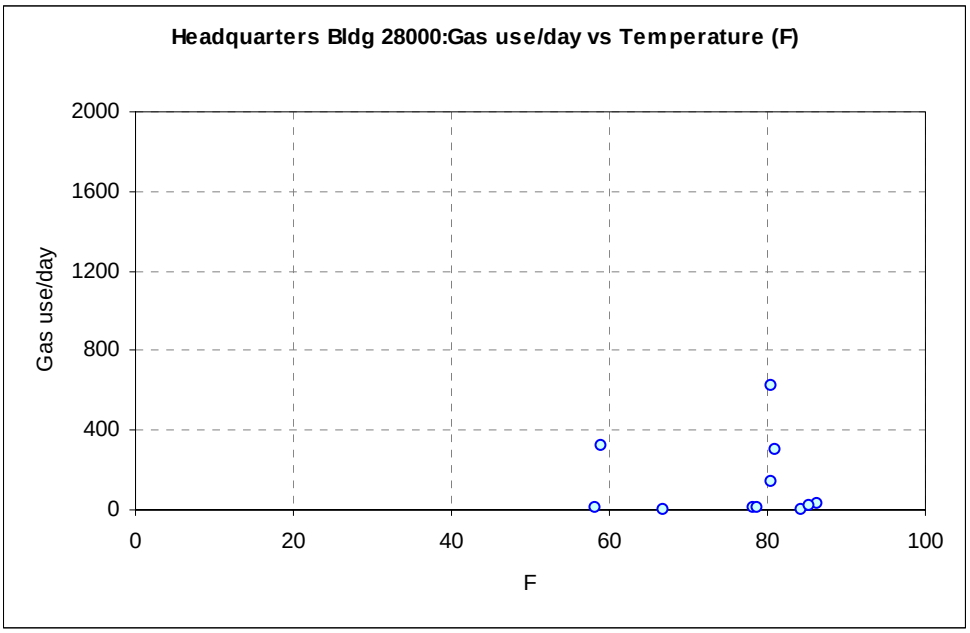
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 19
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

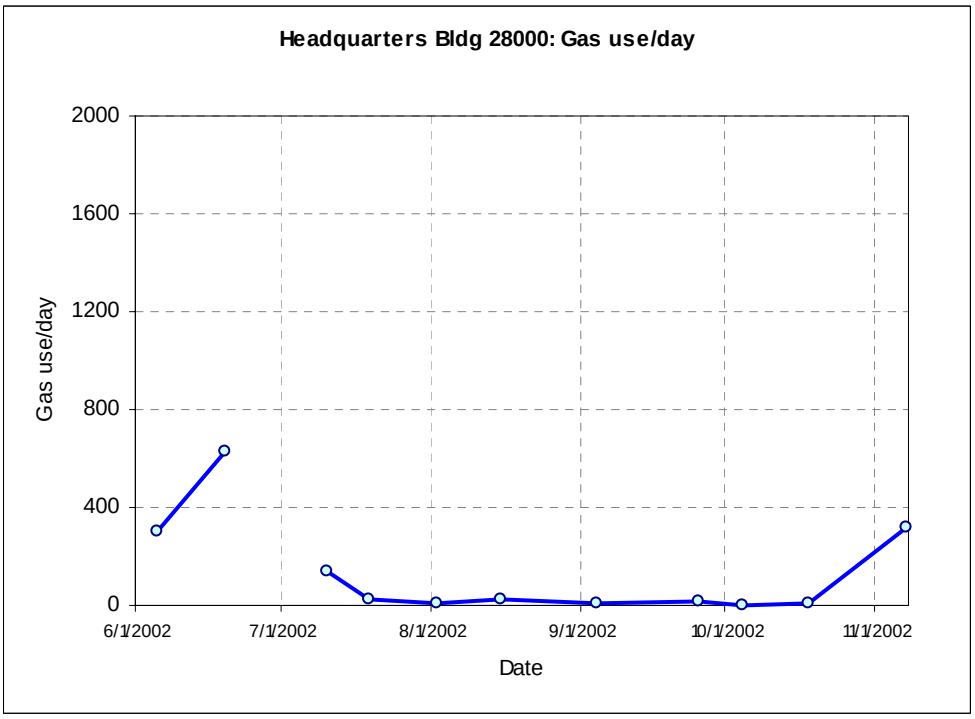
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   19
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     10
   ------------------------------------
       Ymean = 17817.500
   ------------------------------------
      StdDev = 18807.998
   ------------------------------------
    CV-StDev =   105.559 %
   ------------------------------------
```


Headquarters Bldg 28000: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.10.2. Natural Gas From Manual Readings

28000 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									10		
6/5/2002	37412	5831900	6/5/2002	6/19/2002	14	5831900	5832326	426	4260	304	81.1
6/19/2002	37426	5832326	6/19/2002	6/26/2002	7	5832326	5832764	438	4380	626	80.6
6/26/2002	37433	5832764	6/26/2002	7/10/2002	14	5832764	5832603	-161	-1610		79.7
7/10/2002	37447	5832603	7/10/2002	7/19/2002	9	5832603	5832729	126	1260	140	80.6
7/19/2002	37456	5832729	7/19/2002	8/2/2002	14	5832729	5832765	36	360	26	86.4
8/2/2002	37470	5832765	8/2/2002	8/15/2002	13	5832765	5832771	6	60	5	84.3
8/15/2002	37483	5832771	8/15/2002	9/4/2002	20	5832771	5832812	41	410	21	85.4
9/4/2002	37503	5832812	9/4/2002	9/25/2002	21	5832812	5832826	14	140	7	78.2
9/25/2002	37524	5832826	9/25/2002	10/4/2002	9	5832826	5832839	13	130	14	78.7
10/4/2002	37533	5832839	10/4/2002	10/18/2002	14	5832839	5832844	5	50	4	66.9
10/18/2002	37547	5832844	10/18/2002	11/7/2002	20	5832844	5832860	16	160	8	58.1
11/7/2002	37567	5832860	11/7/2002	11/19/2002	12	5832860	5833242	382	3820	318	59.1
11/19/2002	37579	5833242	11/19/2002	1/0/1900	####	5833242	0				

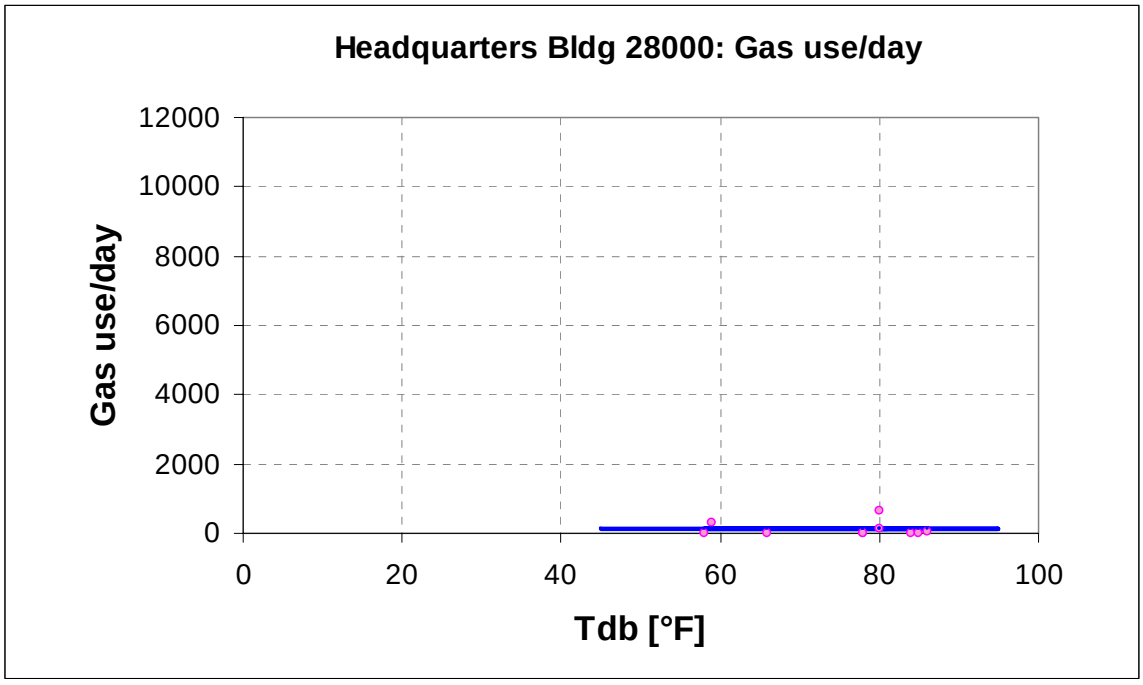

Headquarters Bldg 28000:Gas use/day vs Temperature (F)
Gas use/day
2000
1600
1200
800
400
0
0
20
40
60
80
100
F


Headquarters Bldg 28000: Gas use/day
Gas use/day
2000
1600
1200
800
400
0
6/1/2002
7/1/2002
8/1/2002
9/1/2002
10/1/2002
11/1/2002
Date

12.3.10.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 20
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   20
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     11
   ------------------------------------
       Ymean =   133.909
   ------------------------------------
      StdDev =   202.296
   ------------------------------------
    CV-StDev =   151.069 %
   ------------------------------------
```


Headquarters Bldg 28000: Gas use/day
Gas use/day
12000
10000
8000
6000
4000
2000
0
0
20
40
60
80
100
Tdb [°F]

12.3.11. 42000 Sports USA

12.3.11.1. Electricity Use From Manual Readings

42000 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1		
6/5/2002	37412	broke	6/5/2002	6/19/2002	14	broke	broke	#VALUE!	#VALUE!	#VALUE!	81.1
6/19/2002	37426	broke	6/19/2002	6/26/2002	7	broke	broke	#VALUE!	#VALUE!	#VALUE!	80.6
6/26/2002	37433	broke	6/26/2002	7/10/2002	14	broke	broke	#VALUE!	#VALUE!	#VALUE!	79.7
7/10/2002	37447	broke	7/10/2002	7/19/2002	9	broke	broke	#VALUE!	#VALUE!	#VALUE!	80.6
7/19/2002	37456	broke	7/19/2002	8/2/2002	14	broke	broke	#VALUE!	#VALUE!	#VALUE!	86.4
8/2/2002	37470	broke	8/2/2002	8/15/2002	13	broke	broke	#VALUE!	#VALUE!	#VALUE!	84.3
8/15/2002	37483	broke	8/15/2002	9/4/2002	20	broke	1785	#VALUE!	#VALUE!	#VALUE!	85.4
9/4/2002	37503	1785	9/4/2002	9/25/2002	21	1785	broke	#VALUE!	#VALUE!	#VALUE!	78.2
9/25/2002	37524	broke	9/25/2002	10/4/2002	9	broke	broke	#VALUE!	#VALUE!	#VALUE!	78.7
10/4/2002	37533	broke	10/4/2002	########	14	broke	broke	#VALUE!	#VALUE!	#VALUE!	66.9
10/18/2002	37547	Broke	########	11/7/2002	20	broke	broke	#VALUE!	#VALUE!	#VALUE!	58.1
11/7/2002	37567	Broke	11/7/2002	########	12	broke	broke	#VALUE!	#VALUE!	#VALUE!	59.1
11/19/2002	37579	Broke	########	1/0/1900	####	broke	0	#VALUE!	#VALUE!	#VALUE!	0.0

12.3.11.1.1. Baseline Model From Manual Readings

No baseline model available for this site.

12.3.11.2. Natural Gas From Manual Readings

42000 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									300		
6/5/2002	37412	1964480	6/5/2002	6/19/2002	14	1964480	1964480	0	0	0	81.1
6/19/2002	37426	1964480	6/19/2002	6/26/2002	7	1964480	1964480	0	0	0	80.6
6/26/2002	37433	1964480	6/26/2002	7/10/2002	14	1964480	broke	#VALUE!	#VALUE!	#VALUE!	79.7
7/10/2002	37447	broke	7/10/2002	7/19/2002	9	broke	1964480	#VALUE!	#VALUE!	#VALUE!	80.6
7/19/2002	37456	1964480	7/19/2002	8/2/2002	14	1964480	broke	#VALUE!	#VALUE!	#VALUE!	86.4
8/2/2002	37470	broke	8/2/2002	8/15/2002	13	broke	0	#VALUE!	#VALUE!	#VALUE!	84.3
8/15/2002	37483		8/15/2002	9/4/2002	20	0	1964480	2E+06	6E+08	98224	85.4
9/4/2002	37503	1964480	9/4/2002	9/25/2002	21	1964480	broke	#VALUE!	#VALUE!	#VALUE!	78.7
9/25/2002	37524	broke	9/25/2002	10/4/2002	9	broke	broke	#VALUE!	#VALUE!	#VALUE!	
10/4/2002	37533	broke	10/4/2002	10/18/2002	14	broke	broke	#VALUE!	#VALUE!	#VALUE!	
10/18/2002	37547	broke	########	11/7/2002	20	broke	broke	#VALUE!	#VALUE!	#VALUE!	
11/7/2002	37567	broke	11/7/2002	11/19/2002	12	broke	broke	#VALUE!	#VALUE!	#VALUE!	
11/19/2002	37579	broke	########	1/0/1900	####	broke		0	#VALUE!	#VALUE!	#VALUE!	

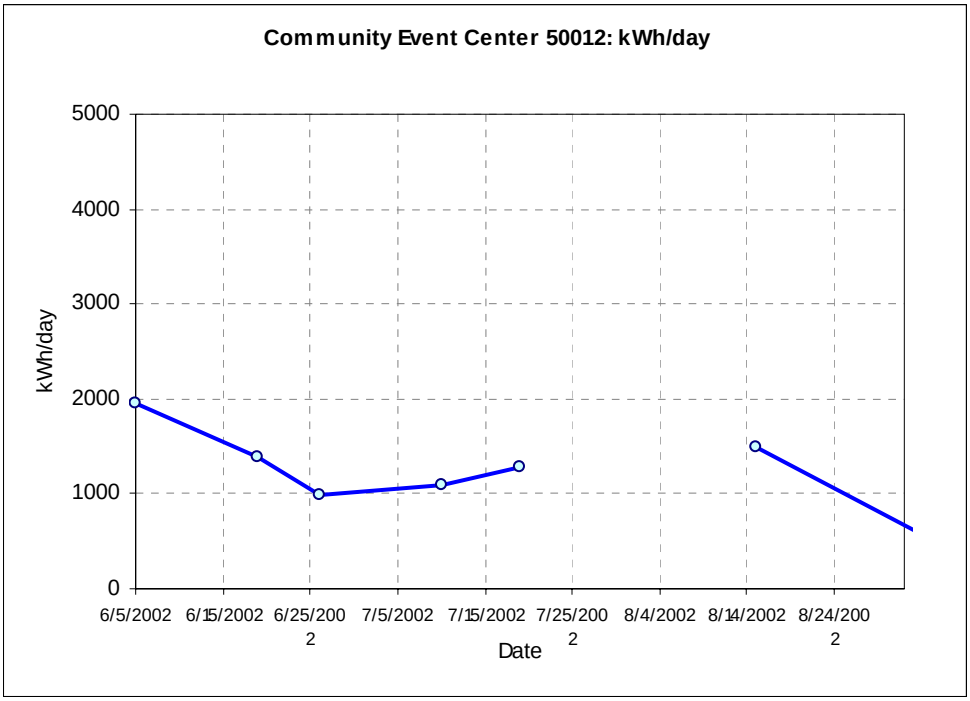
12.3.11.2.1. Baseline Model From Manual Readings

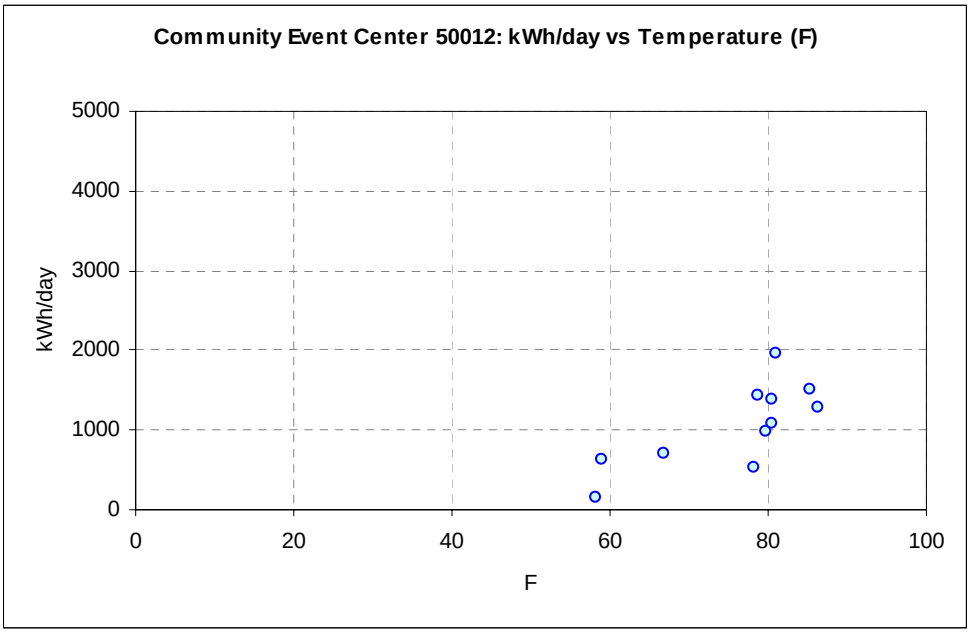
No baseline model available for this site.

12.3.12. 50012 Community Event Center

12.3.12.1. Electricity Use From Manual Readings

50012 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									?		
6/5/2002	37412	1380	6/5/2002	6/19/2002	14	1380	28862	27482		1963	81.1
6/19/2002	37426	28862	6/19/2002	6/26/2002	7	28862	38570	9708		1387	80.6
6/26/2002	37433	38570	6/26/2002	7/10/2002	14	38570	52408	13838		988	79.7
7/10/2002	37447	52408	7/10/2002	7/19/2002	9	52408	62185	9777		1086	80.6
7/19/2002	37456	62185	7/19/2002	8/2/2002	14	62185	80229	18044		1289	86.4
8/2/2002	37470	80229	8/2/2002	8/15/2002	13	80229	3350	-76879			84.3
8/15/2002	37483	3350	8/15/2002	9/4/2002	20	3350	33270	29920		1496	85.4
9/4/2002	37503	33270	9/4/2002	9/25/2002	21	33270	44311	11041		526	78.2
9/25/2002	37524	44311	9/25/2002	10/4/2002	9	44311	57133	12822		1425	78.7
10/4/2002	37533	57133	10/4/2002	########	14	57133	66948	9815		701	66.9
10/18/2002	37547	66948	########	11/7/2002	20	66948	70054	3106		155	58.1
11/7/2002	37567	70054	11/7/2002	########	12	70054	77557	7503		625	59.1
11/19/2002	37579	77557	########	1/0/1900	####	77557	0	-77557		2	0.0

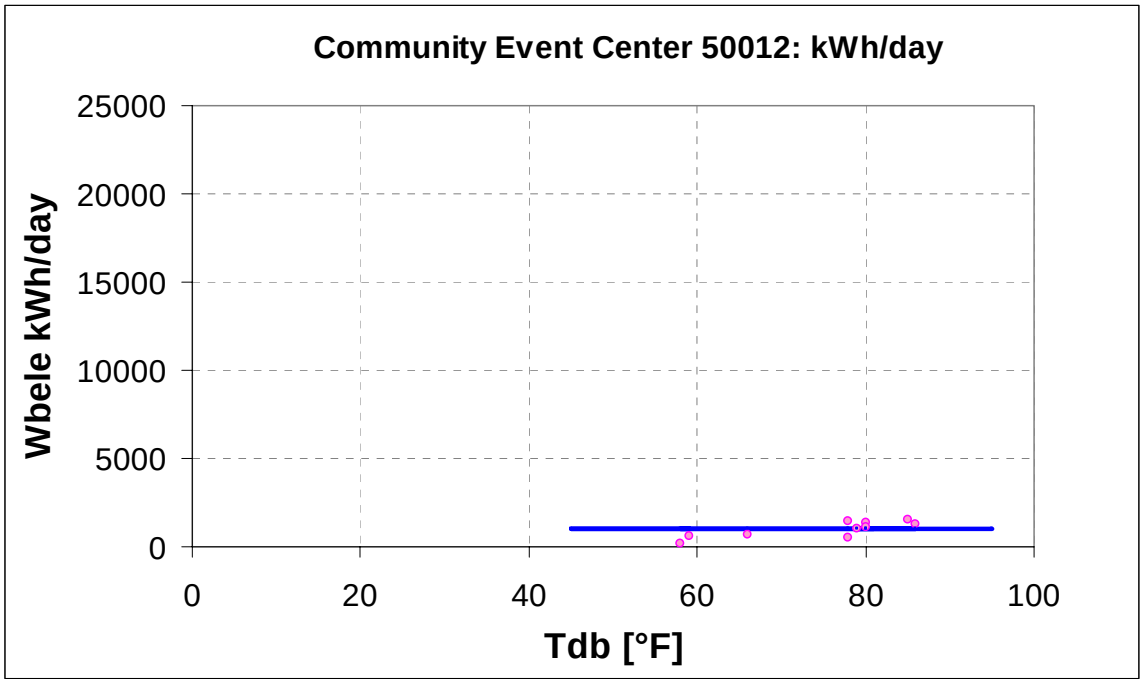

Community Event Center 50012: kWh/day
5000
4000
3000
2000
1000
0
kWh/day
6/5/2002
6/15/2002
6/25/2002
7/5/2002
7/15/2002
7/25/2002
8/4/2002
8/14/2002
8/24/2002
Date


Community Event Center 50012: kWh/day vs Temperature (F)
5000
4000
3000
2000
1000
0
kWh/day
0
20
40
60
80
100
F

12.3.12.1.1. Baseline Model From Manual Readings

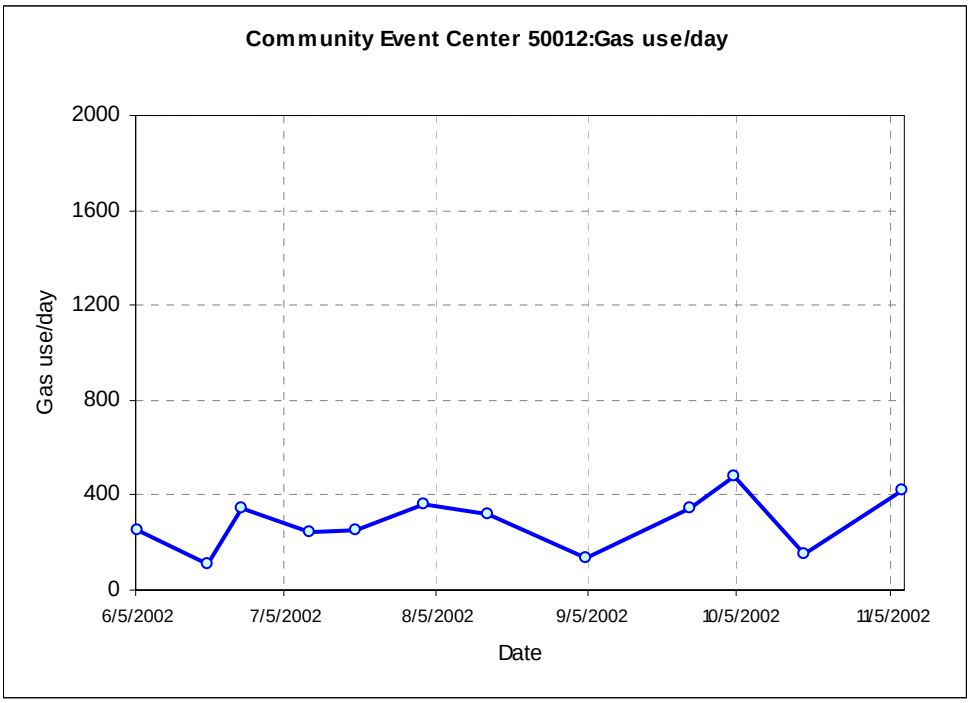
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 21
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

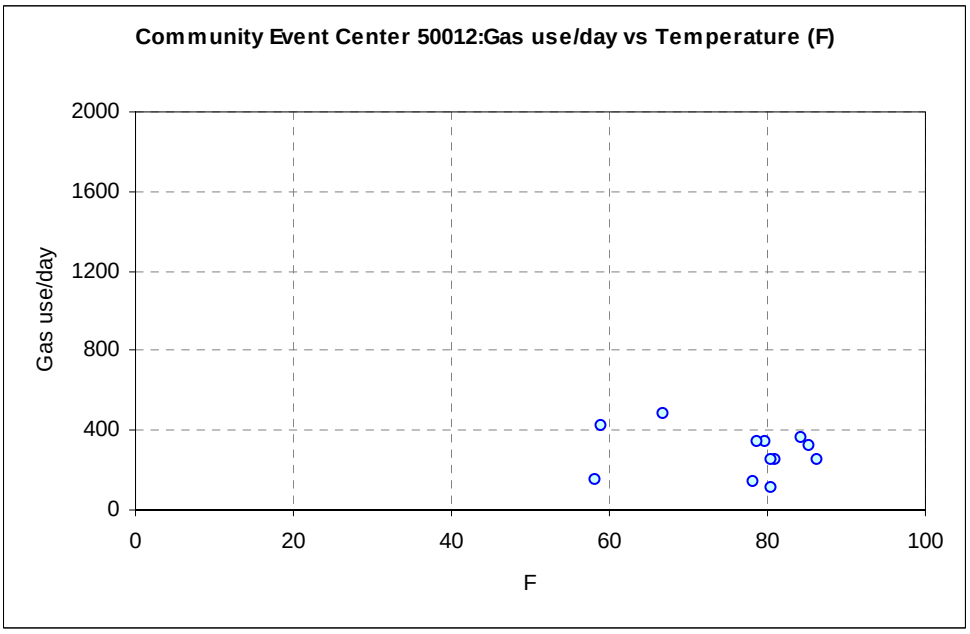
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   21
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     11
   ------------------------------------
       Ymean =  1058.273
   ------------------------------------
      StdDev =   522.132
   ------------------------------------
    CV-StDev =    49.338 %
   ------------------------------------
```


Community Event Center 50012: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.12.2. Natural Gas From Manual Readings

50012 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1		
6/5/2002	37412	2609318	6/5/2002	6/19/2002	14	2609318	2612844	3526	3526	252	81.1
6/19/2002	37426	2612844	6/19/2002	6/26/2002	7	2612844	2613610	766	766	109	80.6
6/26/2002	37433	2613610	6/26/2002	7/10/2002	14	2613610	2618375	4765	4765	340	79.7
7/10/2002	37447	2618375	7/10/2002	7/19/2002	9	2618375	2620598	2223	2223	247	80.6
7/19/2002	37456	2620598	7/19/2002	8/2/2002	14	2620598	2624181	3583	3583	256	86.4
8/2/2002	37470	2624181	8/2/2002	8/15/2002	13	2624181	2628855	4674	4674	360	84.3
8/15/2002	37483	2628855	8/15/2002	9/4/2002	20	2628855	2635269	6414	6414	321	85.4
9/4/2002	37503	2635269	9/4/2002	9/25/2002	21	2635269	2638139	2870	2870	137	78.2
9/25/2002	37524	2638139	9/25/2002	10/4/2002	9	2638139	2641232	3093	3093	344	78.7
10/4/2002	37533	2641232	10/4/2002	10/18/2002	14	2641232	2647953	6721	6721	480	66.9
10/18/2002	37547	2647953	10/18/2002	11/7/2002	20	2647953	2651024	3071	3071	154	58.1
11/7/2002	37567	2651024	11/7/2002	11/19/2002	12	2651024	2656042	5018	5018	418	59.1
11/19/2002	37579	2656042	11/19/2002	1/0/1900	#####	2656042	0	-3E+06	-3E+06	71	0.0

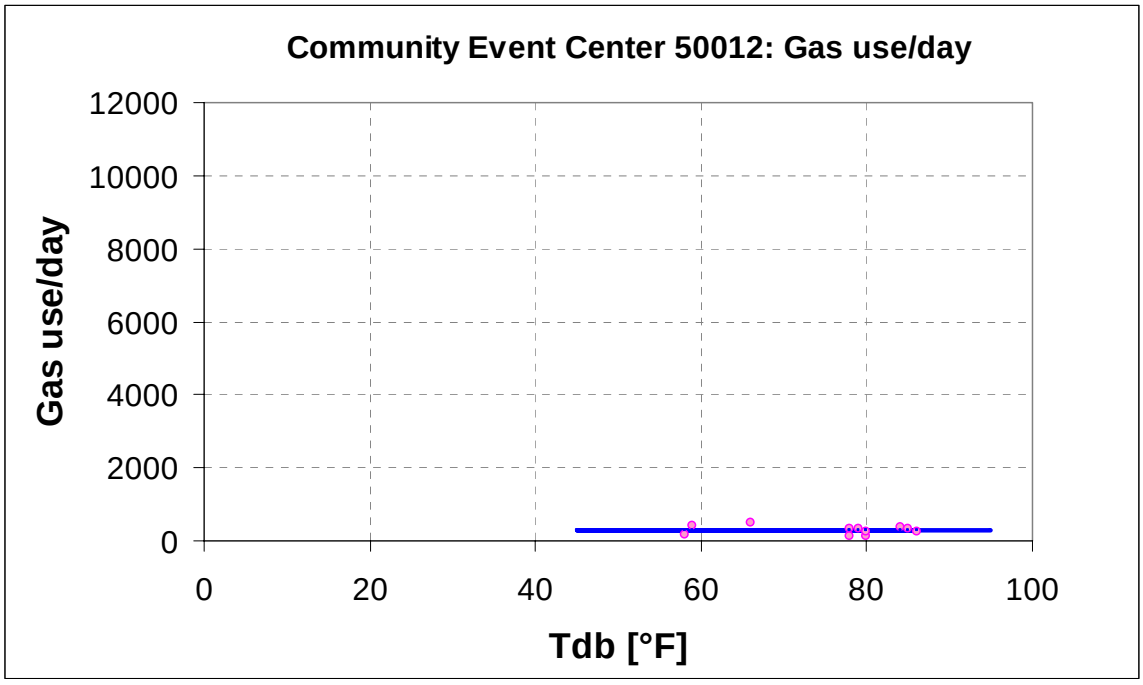

Community Event Center 50012:Gas use/day
2000
1600
1200
800
400
0
Gas use/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Community Event Center 50012:Gas use/day vs Temperature (F)
2000
1600
1200
800
400
0
Gas use/day
0
20
40
60
80
100
F

12.3.12.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 22
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

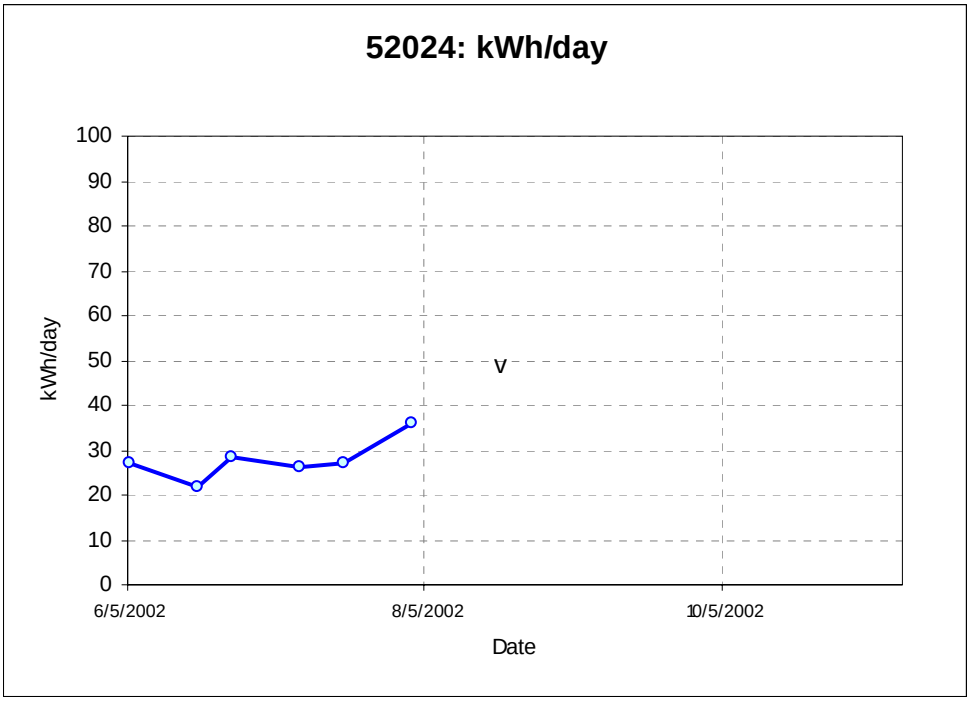
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   22
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     12
   ------------------------------------
       Ymean =   284.833
   ------------------------------------
      StdDev =   113.840
   ------------------------------------
    CV-StDev =    39.967 %
   ------------------------------------
```

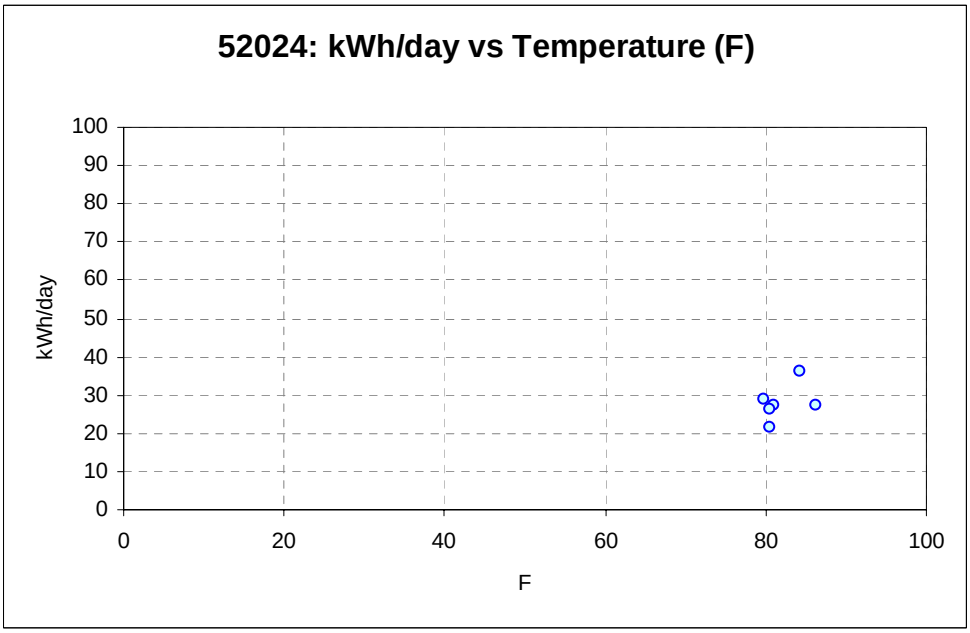

Community Event Center 50012: Gas use/day
Gas use/day
12000
10000
8000
6000
4000
2000
0
0
20
40
60
80
100
Tdb [°F]

12.3.13. 52024 COMMAND Child Care

12.3.13.1. Electricity Use From Manual Readings

52024 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									?		
6/5/2002	37412	76501	6/5/2002	6/19/2002	14	76501	76880	379		27	81.1
6/19/2002	37426	76880	6/19/2002	6/26/2002	7	76880	77032	152		22	80.6
6/26/2002	37433	77032	6/26/2002	7/10/2002	14	77032	77432	400		29	79.7
7/10/2002	37447	77432	7/10/2002	7/19/2002	9	77432	77667	235		26	80.6
7/19/2002	37456	77667	7/19/2002	8/2/2002	14	77667	78048	381		27	86.4
8/2/2002	37470	78048	8/2/2002	8/15/2002	13	78048	78515	467		36	84.3
8/15/2002	37483	78515	8/15/2002	9/4/2002	20	78515	9702	-68813		-3441	85.4
9/4/2002	37503	9702	9/4/2002	9/25/2002	21	9702	7	-9695		-462	78.2
9/25/2002	37524	7	9/25/2002	10/4/2002	9	7	317	310		34	78.7
10/4/2002	37533	317	10/4/2002	10/18/2002	14	317	437	120		9	66.9
10/18/2002	37547	437	10/18/2002	11/7/2002	20	437	600	163		8	58.1
11/7/2002	37567	600	11/7/2002	11/19/2002	12	600	1115	515		43	59.1
11/19/2002	37579	1115	11/19/2002	1/0/1900	####	1115	0	-1115		0	0.0

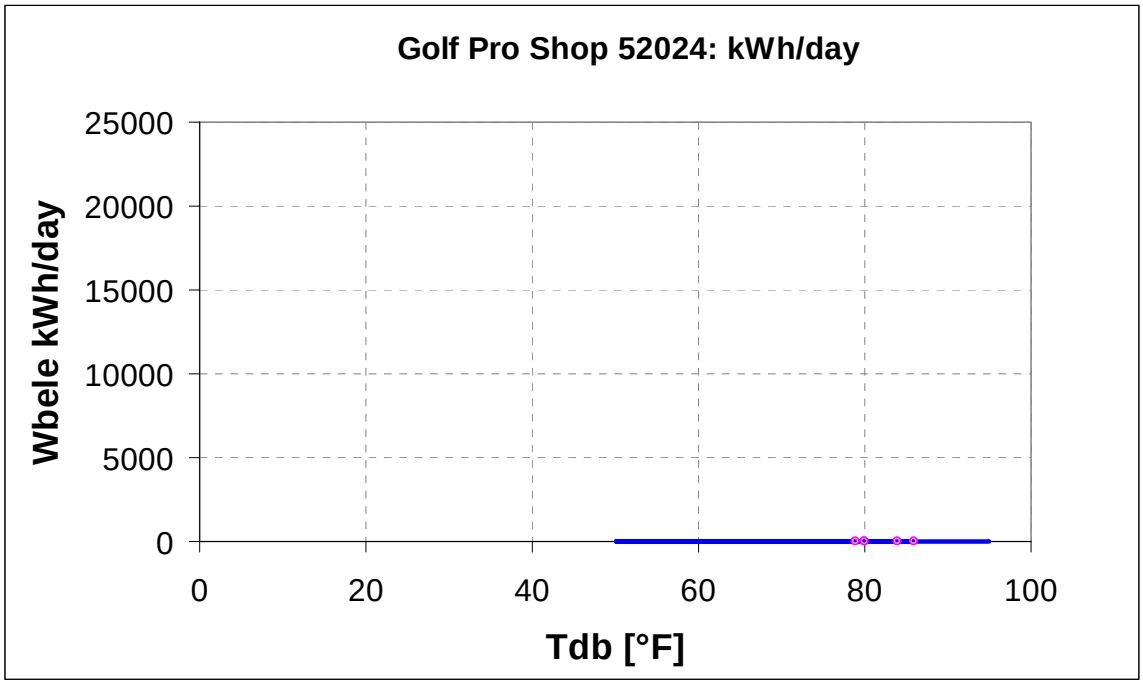

52024: kWh/day
100
90
80
70
60
50
40
30
20
10
0
kWh/day
6/5/2002
8/5/2002
10/5/2002
Date


52024: kWh/day vs Temperature (F)
100
90
80
70
60
50
40
30
20
10
0
kWh/day
0
20
40
60
80
100
F

12.3.13.1.1. Baseline Model From Manual Readings

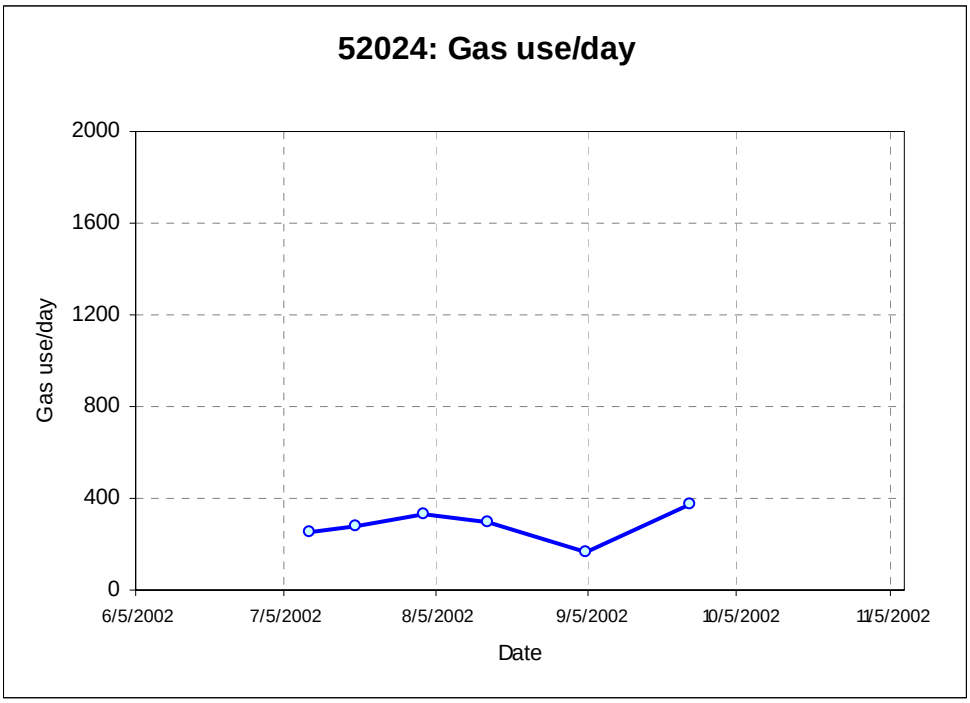
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 23
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

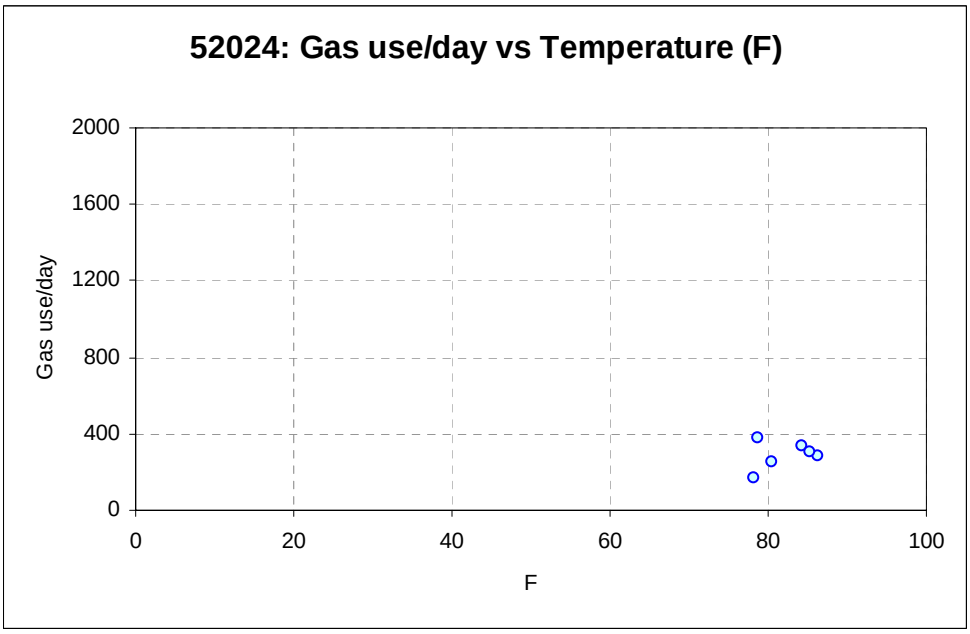
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   23
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =      6
   ------------------------------------
       Ymean =    27.833
   ------------------------------------
      StdDev =     4.622
   ------------------------------------
    CV-StDev =    16.607 %
   ------------------------------------
```


Golf Pro Shop 52024: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.13.2. Natural Gas From Manual Readings

52024 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1		
6/5/2002	37412	9523941	6/5/2002	6/19/2002	14	9523941	9571642	47701	47701	3407	81.
6/19/2002	37426	9571642	6/19/2002	6/26/2002	7	9571642	9619311	47669	47669	6810	80.
6/26/2002	37433	9619311	6/26/2002	7/10/2002	14	9619311	9588400	-30911	-30911		79.
7/10/2002	37447	9588400	7/10/2002	7/19/2002	9	9588400	9590671	2271	2271	252	80.
7/19/2002	37456	9590671	7/19/2002	8/2/2002	14	9590671	9594602	3931	3931	281	86.
8/2/2002	37470	9594602	8/2/2002	8/15/2002	13	9594602	9598941	4339	4339	334	84.
8/15/2002	37483	9598941	8/15/2002	9/4/2002	20	9598941	9604931	5990	5990	300	85.
9/4/2002	37503	9604931	9/4/2002	9/25/2002	21	9604931	9608361	3430	3430	163	78.
9/25/2002	37524	9608361	9/25/2002	10/4/2002	9	9608361	9611761	3400	3400	378	78.
10/4/2002	37533	9611761	10/4/2002	10/18/2002	14	9611761	???	#VALUE!	#VALUE!		66.
10/18/2002	37547	???	10/18/2002	11/7/2002	20	???	???	#VALUE!	#VALUE!		58.
11/7/2002	37567	???	11/7/2002	11/19/2002	12	???	???	#VALUE!	#VALUE!		59.
11/19/2002	37579	???	11/19/2002	1/0/1900	####	???		0	#VALUE!	#VALUE!		0.

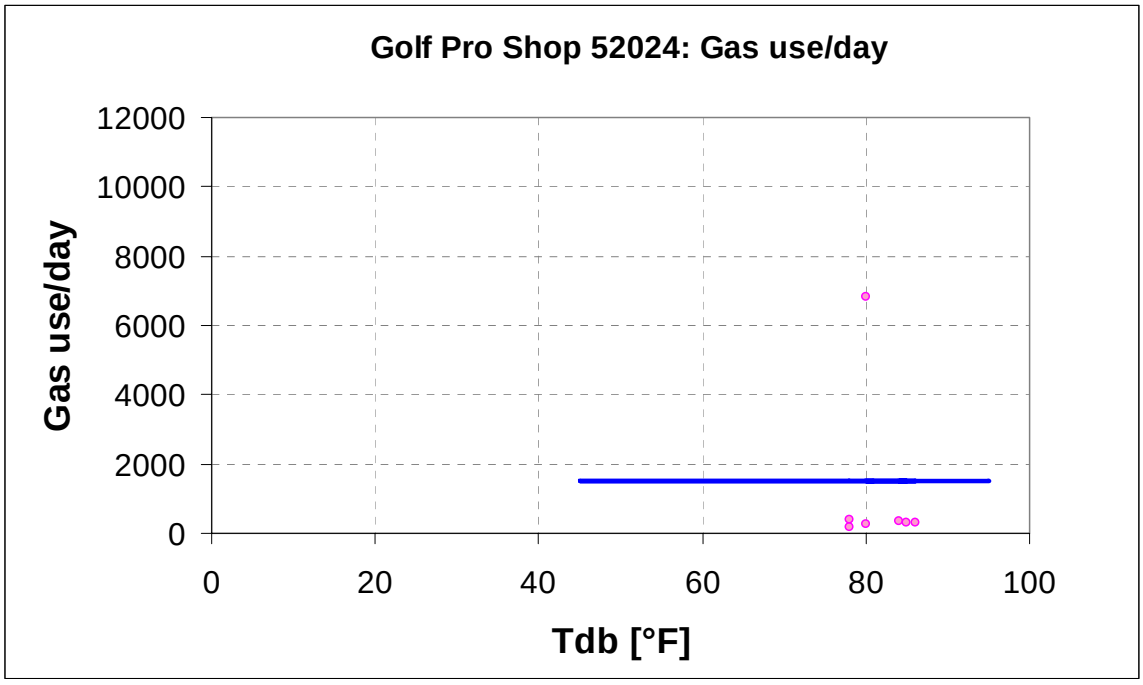

52024: Gas use/day
2000
1600
1200
800
400
0
Gas use/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


52024: Gas use/day vs Temperature (F)
2000
1600
1200
800
400
0
Gas use/day
0
20
40
60
80
100
F

12.3.13.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 24
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

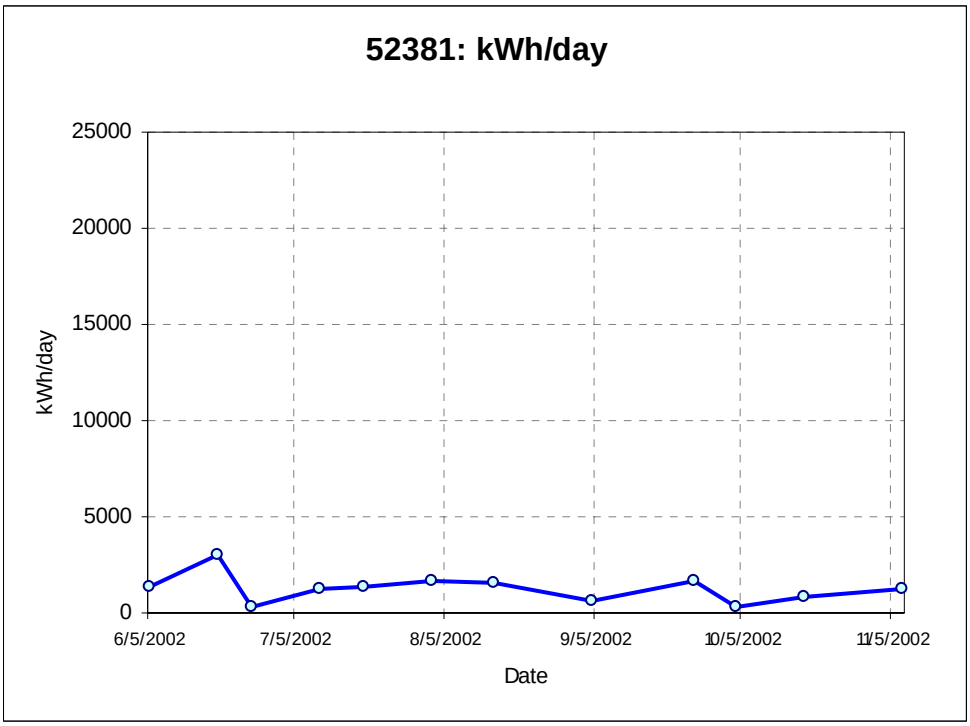
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   24
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =      8
   ------------------------------------
       Ymean =  1490.625
   ------------------------------------
      StdDev =  2411.920
   ------------------------------------
    CV-StDev =   161.806 %
   ------------------------------------
```

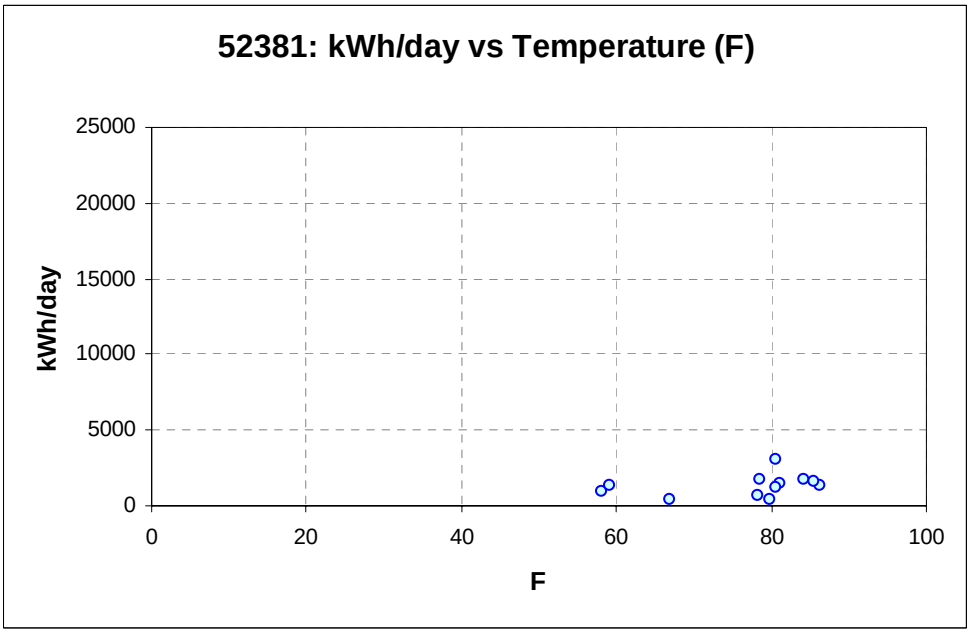

Golf Pro Shop 52024: Gas use/day
Gas use/day
12000
10000
8000
6000
4000
2000
0
0
20
40
60
80
100
Tdb [°F]

12.3.14. 52381 Golf Pro Shop

12.3.14.1. Electricity Use From Manual Readings

52381 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									120	2983	
6/5/2002	37412	8159	6/5/2002	6/19/2002	14	8159	8322	163	19560	1397	81.1
6/19/2002	37426	8322	6/19/2002	6/26/2002	7	8322	8496	174	20880	2983	80.6
6/26/2002	37433	8496	6/26/2002	7/10/2002	14	8496	8536	40	4800	343	79.7
7/10/2002	37447	8536	7/10/2002	7/19/2002	9	8536	8629	93	11160	1240	80.6
7/19/2002	37456	8629	7/19/2002	8/2/2002	14	8629	8785	156	18720	1337	86.4
8/2/2002	37470	8785	8/2/2002	8/15/2002	13	8785	8971	186	22320	1717	84.3
8/15/2002	37483	8971	8/15/2002	9/4/2002	20	8971	9225	254	30480	1524	85.4
9/4/2002	37503	9225	9/4/2002	9/25/2002	21	9225	9343	118	14160	674	78.2
9/25/2002	37524	9343	9/25/2002	10/4/2002	9	9343	9471	128	15360	1707	78.7
10/4/2002	37533	9471	10/4/2002	10/18/2002	14	9471	9512	41	4920	351	66.9
10/18/2002	37547	9512	10/18/2002	11/7/2002	20	9512	9658	146	17520	876	58.1
11/7/2002	37567	9658	11/7/2002	11/19/2002	12	9658	9787	129	15480	1290	59.1
11/19/2002	37579	9787	11/19/2002	1/0/1900	####	9787	0	-9787	-1E+06	31	0.0

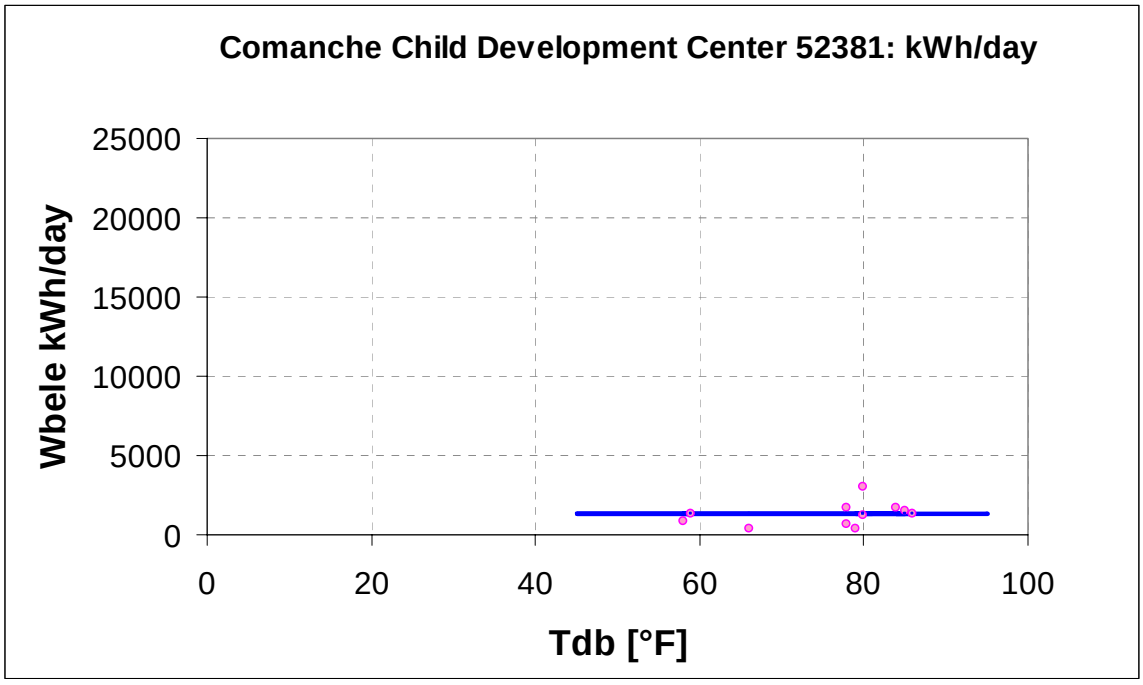

52381: kWh/day
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


52381: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
F

12.3.14.1.1. Baseline Model From Manual Readings

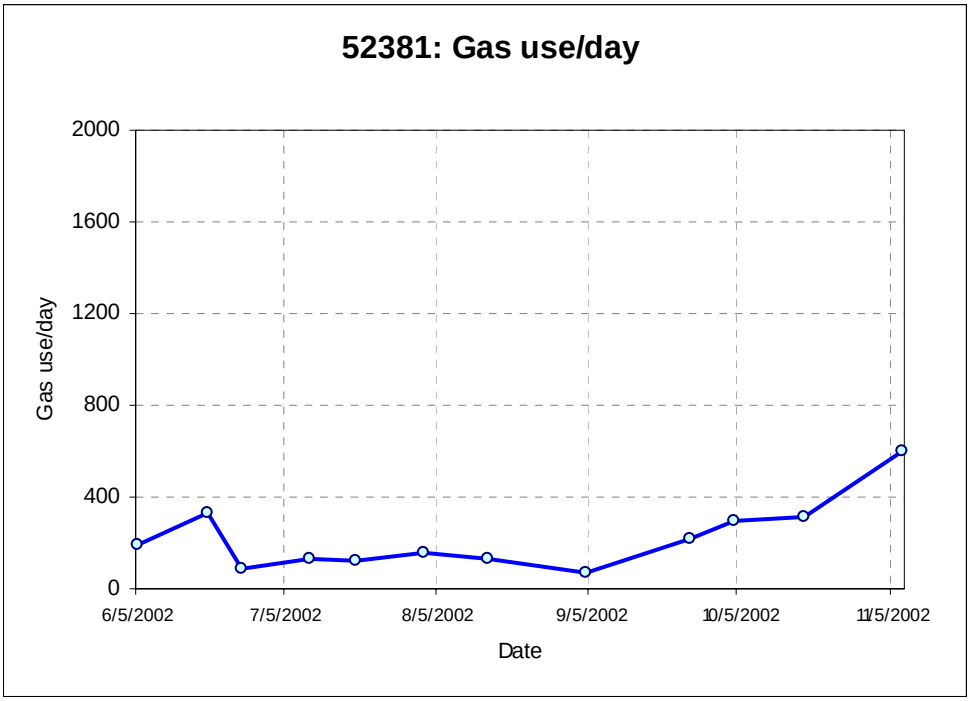
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 25
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

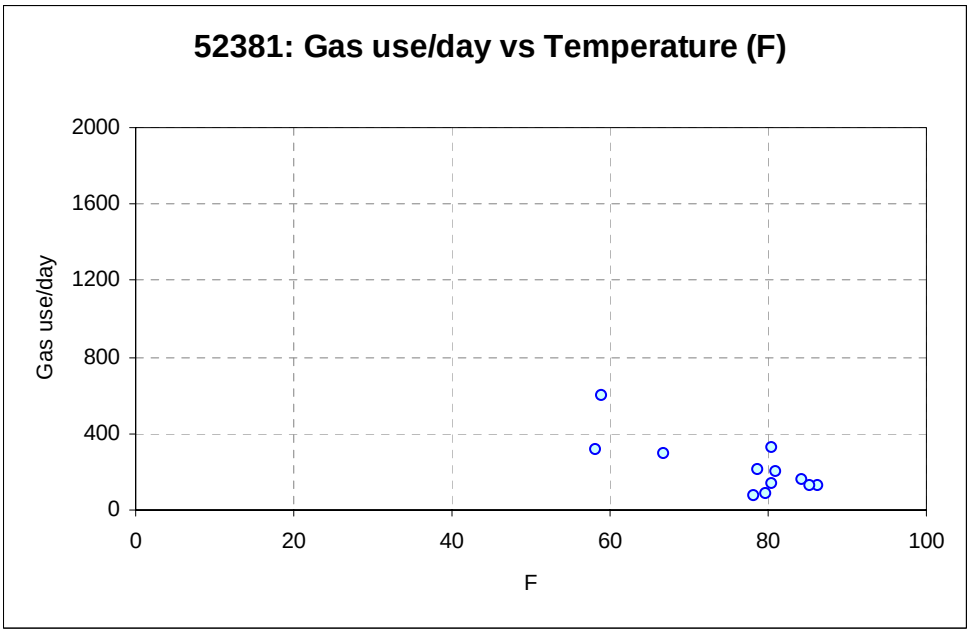
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   25
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     12
   ------------------------------------
       Ymean =  1286.583
   ------------------------------------
      StdDev =   714.946
   ------------------------------------
    CV-StDev =    55.569 %
   ------------------------------------
```


Comanche Child Development Center 52381: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.14.2. Natural Gas From Manual Readings

52381 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1		
6/5/2002	37412	958105	6/5/2002	6/19/2002	14	958105	960841	2736	2736	195	81.1
6/19/2002	37426	960841	6/19/2002	6/26/2002	7	960841	963126	2285	2285	326	80.6
6/26/2002	37433	963126	6/26/2002	7/10/2002	14	963126	964308	1182	1182	84	79.7
7/10/2002	37447	964308	7/10/2002	7/19/2002	9	964308	965488	1180	1180	131	80.6
7/19/2002	37456	965488	7/19/2002	8/2/2002	14	965488	967228	1740	1740	124	86.4
8/2/2002	37470	967228	8/2/2002	8/15/2002	13	967228	969225	1997	1997	154	84.3
8/15/2002	37483	969225	8/15/2002	9/4/2002	20	969225	971805	2580	2580	129	85.4
9/4/2002	37503	971805	9/4/2002	9/25/2002	21	971805	973352	1547	1547	74	78.2
9/25/2002	37524	973352	9/25/2002	10/4/2002	9	973352	975280	1928	1928	214	78.7
10/4/2002	37533	975280	10/4/2002	10/18/2002	14	975280	979365	4085	4085	292	66.9
10/18/2002	37547	979365	10/18/2002	11/7/2002	20	979365	985648	6283	6283	314	58.1
11/7/2002	37567	985648	11/7/2002	11/19/2002	12	985648	992863	7215	7215	601	59.1
11/19/2002	37579	992863	11/19/2002	1/0/1900	####	992863	0	-992863	-992863	26	0.0

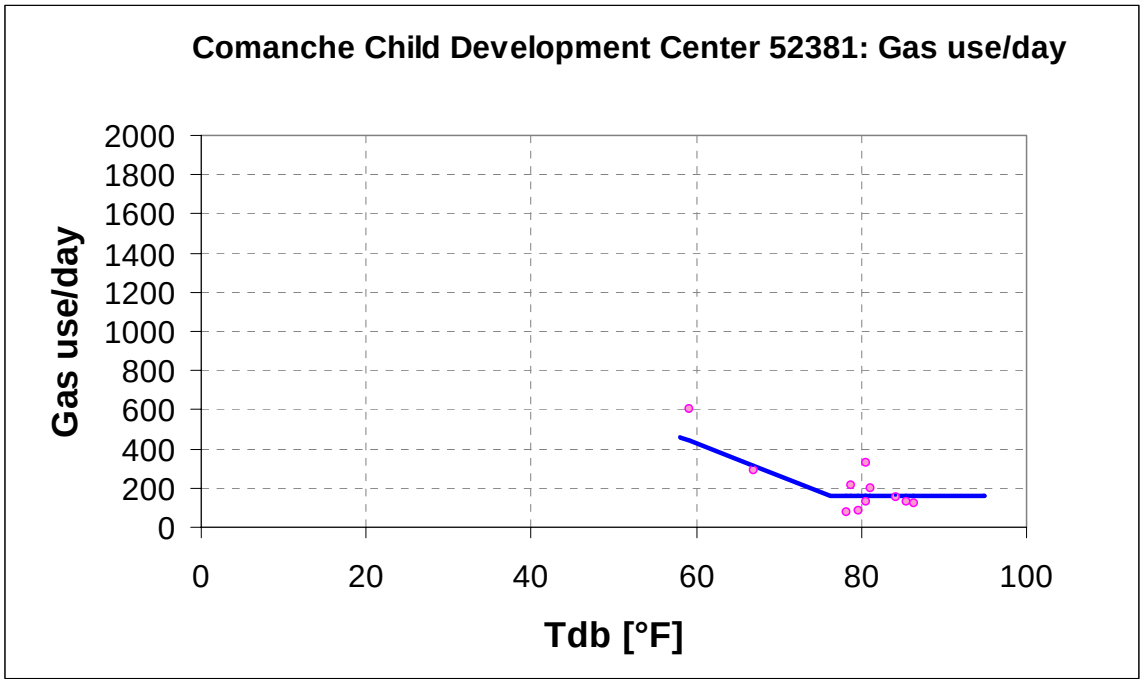

52381: Gas use/day
2000
1600
1200
800
400
0
Gas use/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


52381: Gas use/day vs Temperature (F)
2000
1600
1200
800
400
0
Gas use/day
0
20
40
60
80
100
F

12.3.14.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 26
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 4
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

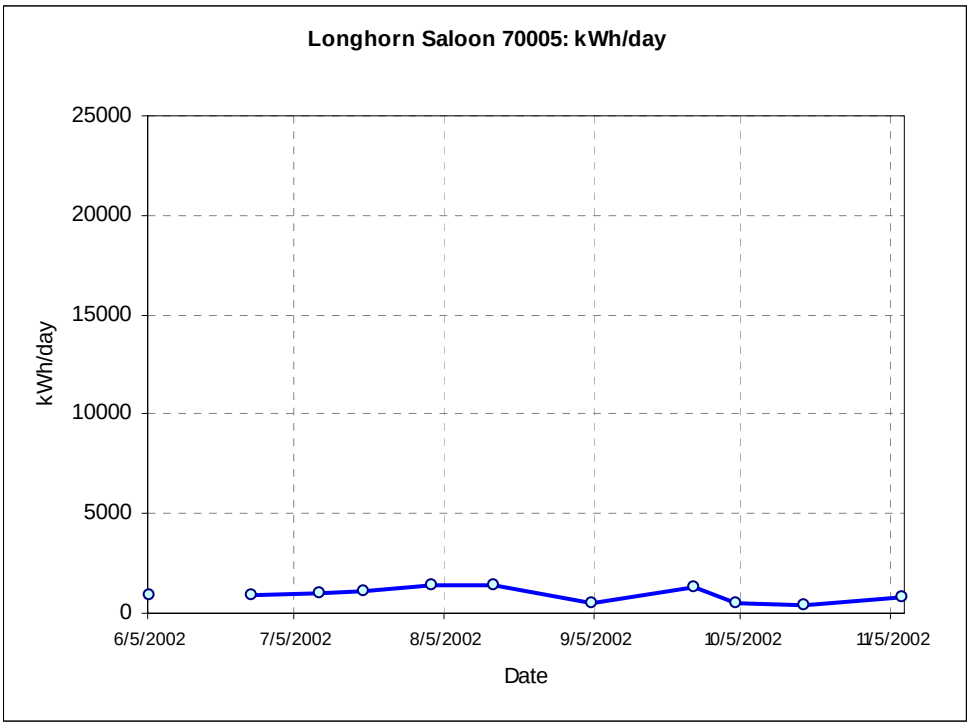
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           3P Heating
    Grouping column No =    4
    Value for grouping =   26
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   3
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     12
          R2 =     0.607
       AdjR2 =     0.607
        RMSE =     97.2601
     CV-RMSE =    44.243%
           p =    -0.283
          DW =     2.271 (p>0)
          N1 =      3
          N2 =      9
         Ycp =    158.9228 (     32.0712)
          LS =    -16.4120 (      4.1766)
          RS =      0.0000 (      0.0000)
         Xcp =     76.2120 (      0.5660)
```

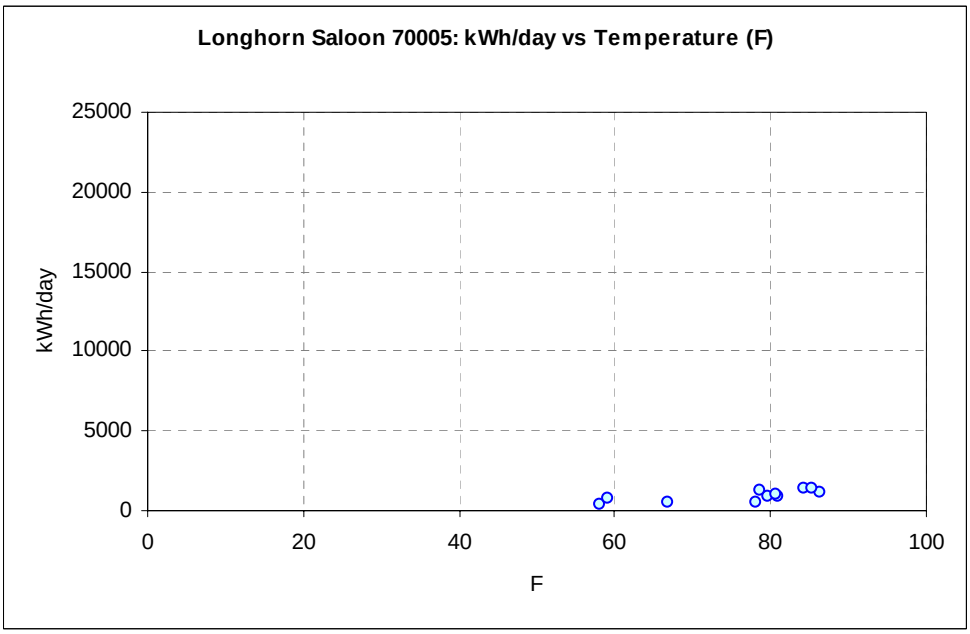

Comanche Child Development Center 52381: Gas use/day
Gas use/day
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

12.3.15. 70005 Longhorn Saloon

12.3.15.1. Electricity Use From Manual Readings

70005 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									40	1406	
6/5/2002	37412	9650	6/5/2002	6/19/2002	14	9650	9974	324	12960	926	81.1
6/19/2002	37426	9974	6/19/2002	6/26/2002	7	9974	162	-9812	-392480		80.6
6/26/2002	37433	162	6/26/2002	7/10/2002	14	162	467	305	12200	871	79.7
7/10/2002	37447	467	7/10/2002	7/19/2002	9	467	683	216	8640	960	80.6
7/19/2002	37456	683	7/19/2002	8/2/2002	14	683	1064	381	15240	1089	86.4
8/2/2002	37470	1064	8/2/2002	8/15/2002	13	1064	1507	443	17720	1363	84.3
8/15/2002	37483	1507	8/15/2002	9/4/2002	20	1507	2210	703	28120	1406	85.4
9/4/2002	37503	2210	9/4/2002	9/25/2002	21	2210	2491	281	11240	535	78.2
9/25/2002	37524	2491	9/25/2002	10/4/2002	9	2491	2780	289	11560	1284	78.7
10/4/2002	37533	2780	10/4/2002	10/18/2002	14	2780	2958	178	7120	509	66.9
10/18/2002	37547	2958	10/18/2002	11/7/2002	20	2958	3159	201	8040	402	58.1
11/7/2002	37567	3159	11/7/2002	11/19/2002	12	3159	3400	241	9640	803	59.1
11/19/2002	37579	3400	11/19/2002	1/0/1900	#####	3400	0	-3400	-136000	4	0.0

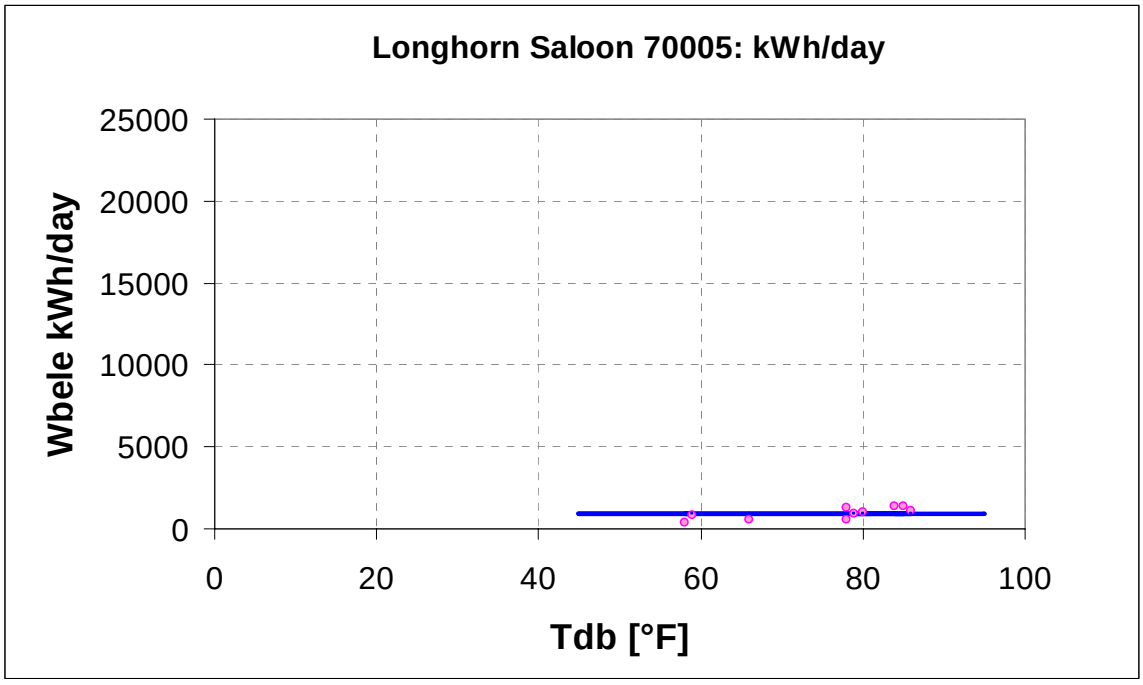

Longhorn Saloon 70005: kWh/day
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Longhorn Saloon 70005: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
F

12.3.15.1.1. Baseline Model From Manual Readings

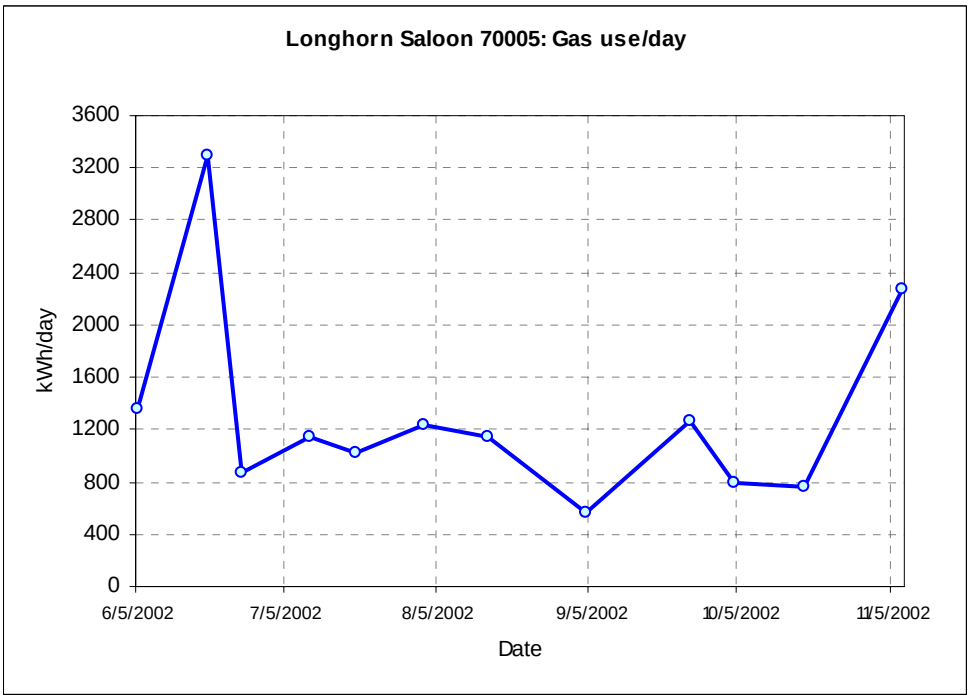
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 27
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

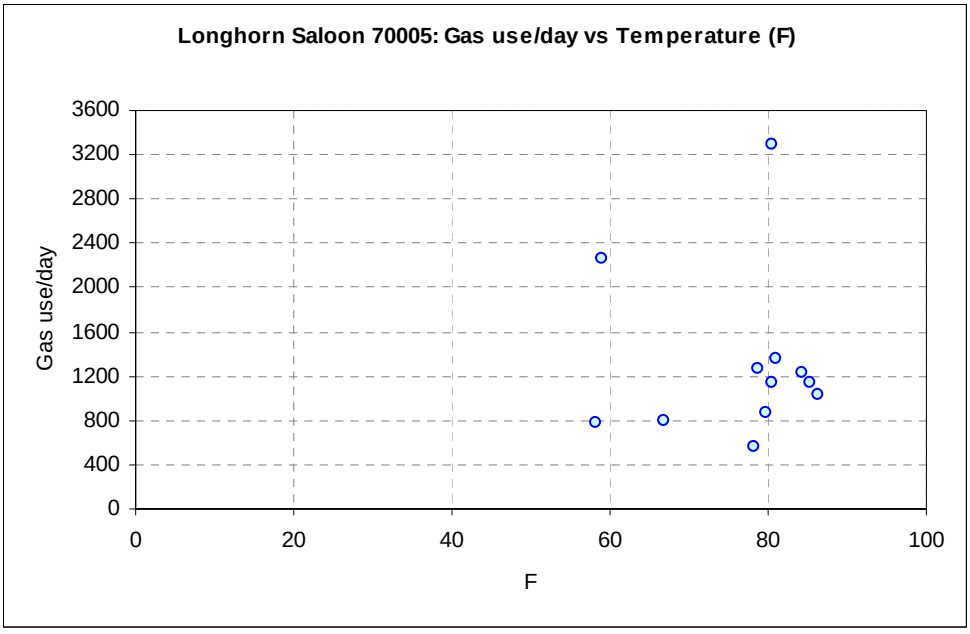
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   27
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     11
   ------------------------------------
       Ymean =   922.545
   ------------------------------------
      StdDev =   345.923
   ------------------------------------
    CV-StDev =    37.497 %
   ------------------------------------
```


Longhorn Saloon 70005: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.15.2. Natural Gas From Manual Readings

70005 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									100		
6/5/2002	37412	3275	6/5/2002	6/19/2002	14	3275	3464	189	18900	1350	81.1
6/19/2002	37426	3464	6/19/2002	6/26/2002	7	3464	3695	231	23100	3300	80.6
6/26/2002	37433	3695	6/26/2002	7/10/2002	14	3695	3816	121	12100	864	79.7
7/10/2002	37447	3816	7/10/2002	7/19/2002	9	3816	3919	103	10300	1144	80.6
7/19/2002	37456	3919	7/19/2002	8/2/2002	14	3919	4063	144	14400	1029	86.4
8/2/2002	37470	4063	8/2/2002	8/15/2002	13	4063	4224	161	16100	1238	84.3
8/15/2002	37483	4224	8/15/2002	9/4/2002	20	4224	4453	229	22900	1145	85.4
9/4/2002	37503	4453	9/4/2002	9/25/2002	21	4453	4572	119	11900	567	78.2
9/25/2002	37524	4572	9/25/2002	10/4/2002	9	4572	4686	114	11400	1267	78.7
10/4/2002	37533	4686	10/4/2002	10/18/2002	14	4686	4798	112	11200	800	66.9
10/18/2002	37547	4798	10/18/2002	11/7/2002	20	4798	4952	154	15400	770	58.1
11/7/2002	37567	4952	11/7/2002	11/19/2002	12	4952	5224	272	27200	2267	59.1
11/19/2002	37579	5224	11/19/2002	1/0/1900	####	5224	0	-5224	-522400	14	0.0

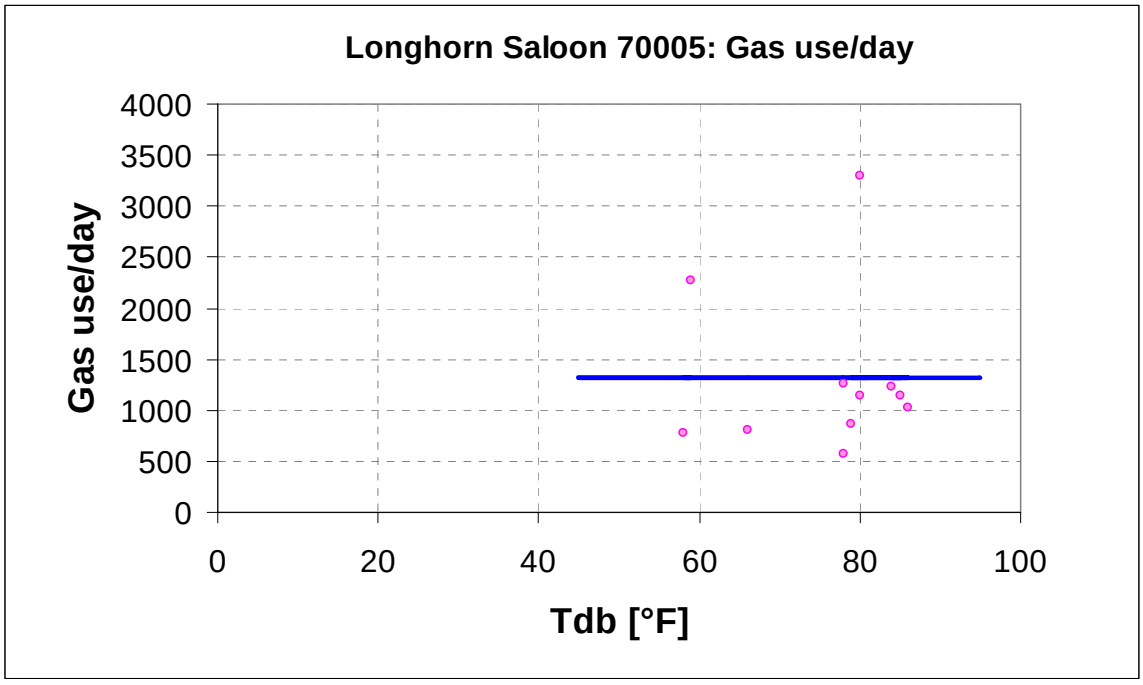

Longhorn Saloon 70005: Gas use/day
kWh/day
3600
3200
2800
2400
2000
1600
1200
800
400
0
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Longhorn Saloon 70005: Gas use/day vs Temperature (F)
Gas use/day
3600
3200
2800
2400
2000
1600
1200
800
400
0
0
20
40
60
80
100
F

12.3.15.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 28
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

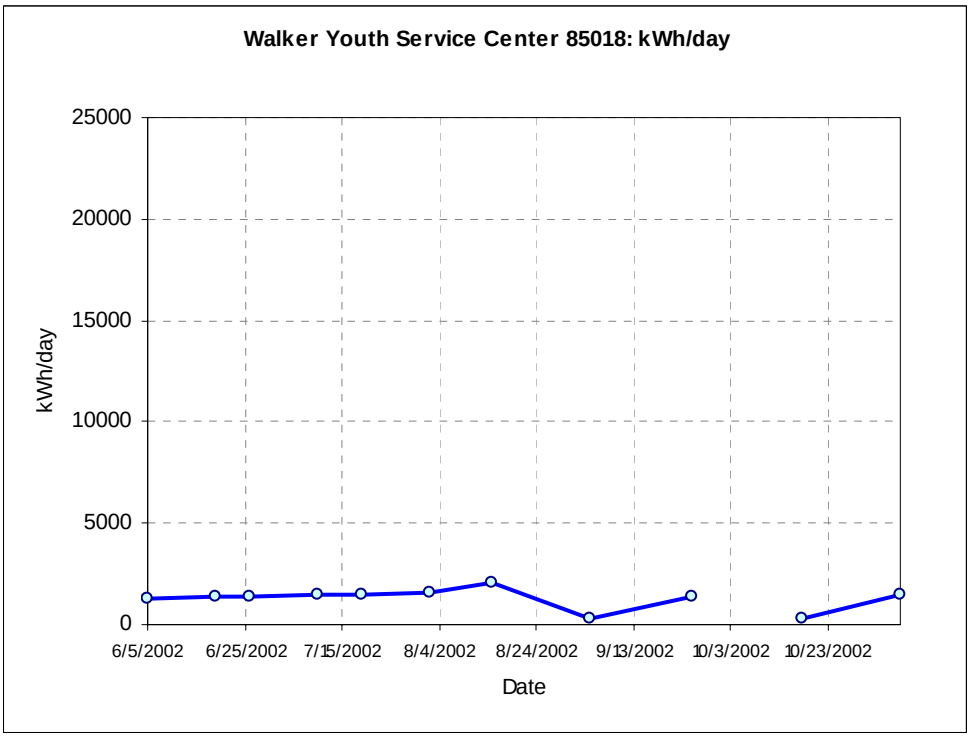
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   28
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     12
   ------------------------------------
       Ymean =  1311.750
   ------------------------------------
      StdDev =   758.045
   ------------------------------------
    CV-StDev =    57.789 %
   ------------------------------------
```

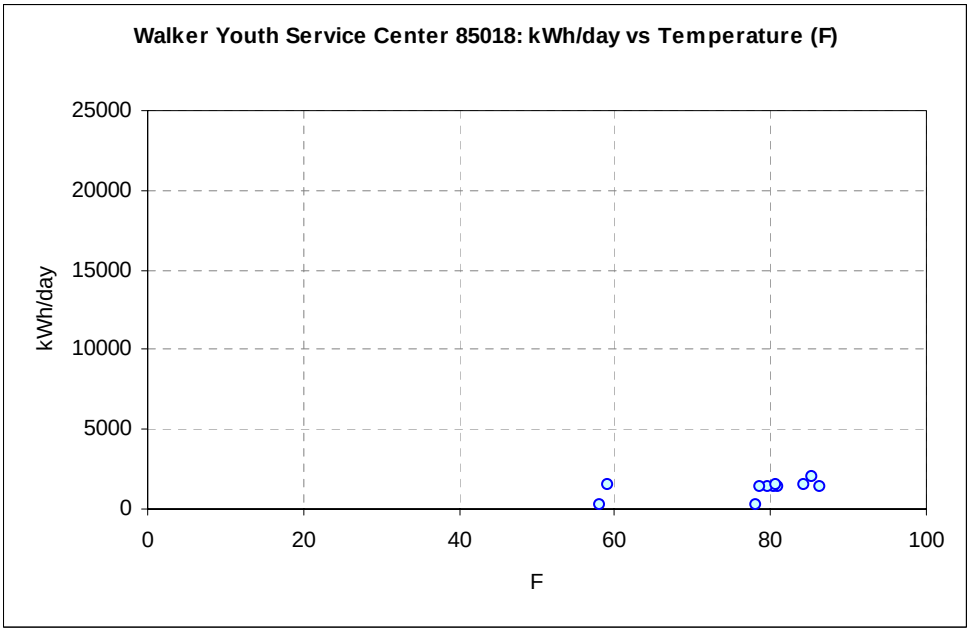

Longhorn Saloon 70005: Gas use/day
Gas use/day
4000
3500
3000
2500
2000
1500
1000
500
0
0
20
40
60
80
100
Tdb [°F]

12.3.16. 85018 Walker Youth Service Center

12.3.16.1. Electricity Use From Manual Readings

85018 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									160	2056	
6/5/2002	37412	14184	6/5/2002	6/19/2002	14	14184	14300	116	18560	1326	81.1
6/19/2002	37426	14300	6/19/2002	6/26/2002	7	14300	14361	61	9760	1394	80.6
6/26/2002	37433	14361	6/26/2002	7/10/2002	14	14361	14485	124	19840	1417	79.7
7/10/2002	37447	14485	7/10/2002	7/19/2002	9	14485	14567	82	13120	1458	80.6
7/19/2002	37456	14567	7/19/2002	8/2/2002	14	14567	14692	125	20000	1429	86.4
8/2/2002	37470	14692	8/2/2002	8/15/2002	13	14692	14819	127	20320	1563	84.3
8/15/2002	37483	14819	8/15/2002	9/4/2002	20	14819	15076	257	41120	2056	85.4
9/4/2002	37503	15076	9/4/2002	9/25/2002	21	15076	15112	36	5760	274	78.2
9/25/2002	37524	15112	9/25/2002	10/4/2002	9	15112	15192	80	12800	1422	78.7
10/4/2002	37533	15192	10/4/2002	10/18/2002	14	15192	15169	-23	-3680		66.9
10/18/2002	37547	15169	10/18/2002	11/7/2002	20	15169	15200	31	4960	248	58.1
11/7/2002	37567	15200	11/7/2002	11/19/2002	12	15200	15313	113	18080	1507	59.1
11/19/2002	37579	15313	11/19/2002	1/0/1900	####	15313	0	-15313	-2E+06	65	0.0

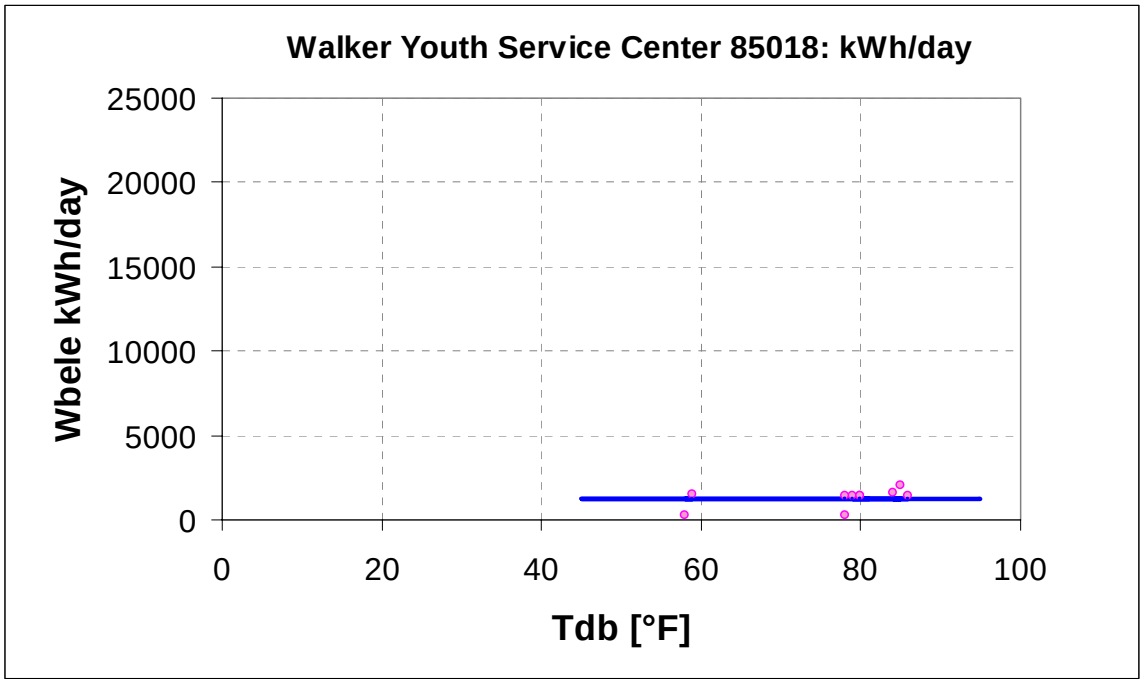

Walker Youth Service Center 85018: kWh/day
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date


Walker Youth Service Center 85018: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
F

12.3.16.1.1. Baseline Model From Manual Readings

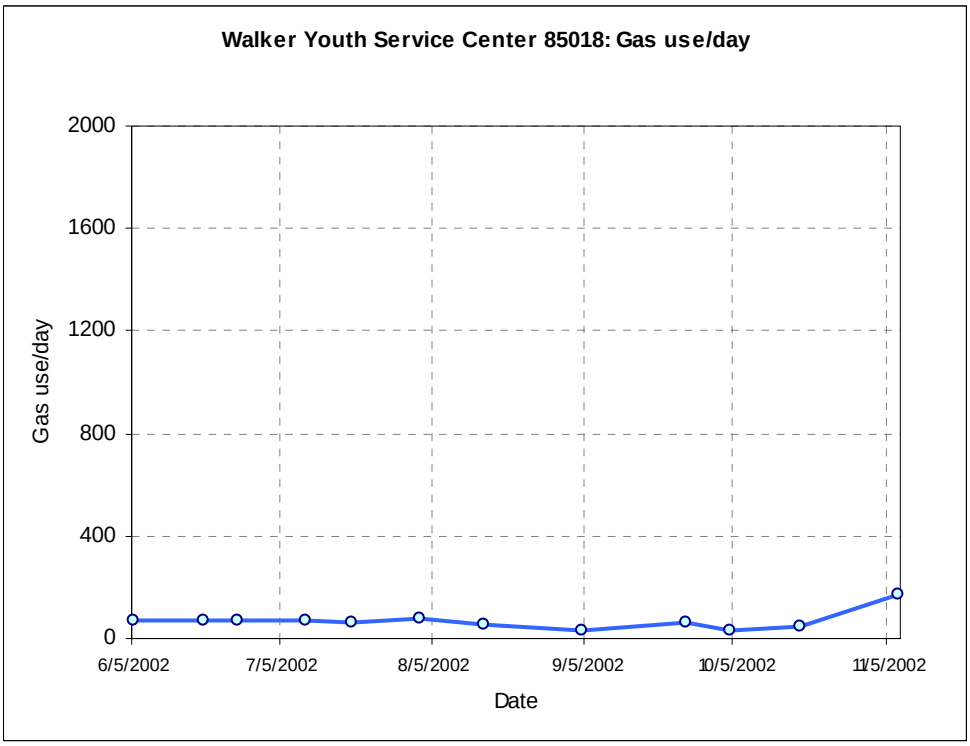
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 29
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

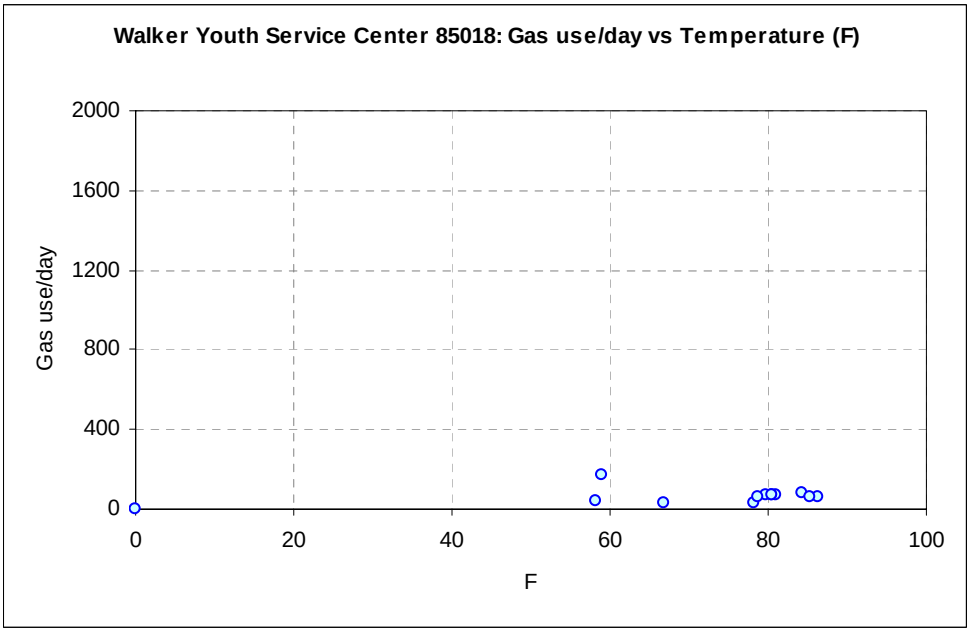
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   29
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     11
   ------------------------------------
       Ymean =  1281.273
   ------------------------------------
      StdDev =   540.256
   ------------------------------------
    CV-StDev =    42.166 %
   ------------------------------------
```


Walker Youth Service Center 85018: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.16.2. Natural Gas From Manual Readings

85018 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									10		
6/5/2002	37412	17036	6/5/2002	6/19/2002	14	17036	17130	94	940	67	81.1
6/19/2002	37426	17130	6/19/2002	6/26/2002	7	17130	17180	50	500	71	80.6
6/26/2002	37433	17180	6/26/2002	7/10/2002	14	17180	17273	93	930	66	79.7
7/10/2002	37447	17273	7/10/2002	7/19/2002	9	17273	17338	65	650	72	80.6
7/19/2002	37456	17338	7/19/2002	8/2/2002	14	17338	17429	91	910	65	86.4
8/2/2002	37470	17429	8/2/2002	8/15/2002	13	17429	17527	98	980	75	84.3
8/15/2002	37483	17527	8/15/2002	9/4/2002	20	17527	17640	113	1130	57	85.4
9/4/2002	37503	17640	9/4/2002	9/25/2002	21	17640	17710	70	700	33	78.2
9/25/2002	37524	17710	9/25/2002	10/4/2002	9	17710	17765	55	550	61	78.7
10/4/2002	37533	17765	10/4/2002	10/18/2002	14	17765	17810	45	450	32	66.9
10/18/2002	37547	17810	10/18/2002	11/7/2002	20	17810	17896	86	860	43	58.1
11/7/2002	37567	17896	11/7/2002	11/19/2002	12	17896	18098	202	2020	168	59.1
11/19/2002	37579	18098	11/19/2002	1/0/1900	-37579	18098	0	-18098	-180980	5	0.0

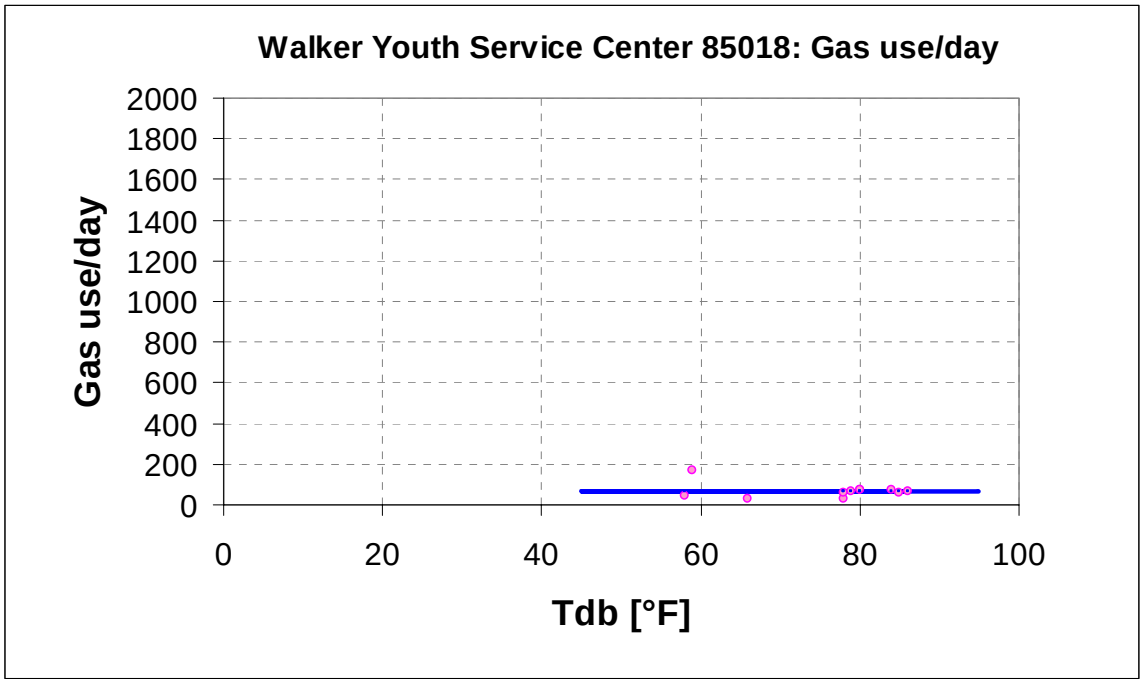

Walker Youth Service Center 85018: Gas use/day
2000
1600
1200
800
400
0
Gas use/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Walker Youth Service Center 85018: Gas use/day vs Temperature (F)
2000
1600
1200
800
400
0
Gas use/day
0
20
40
60
80
100
F

12.3.16.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 30
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

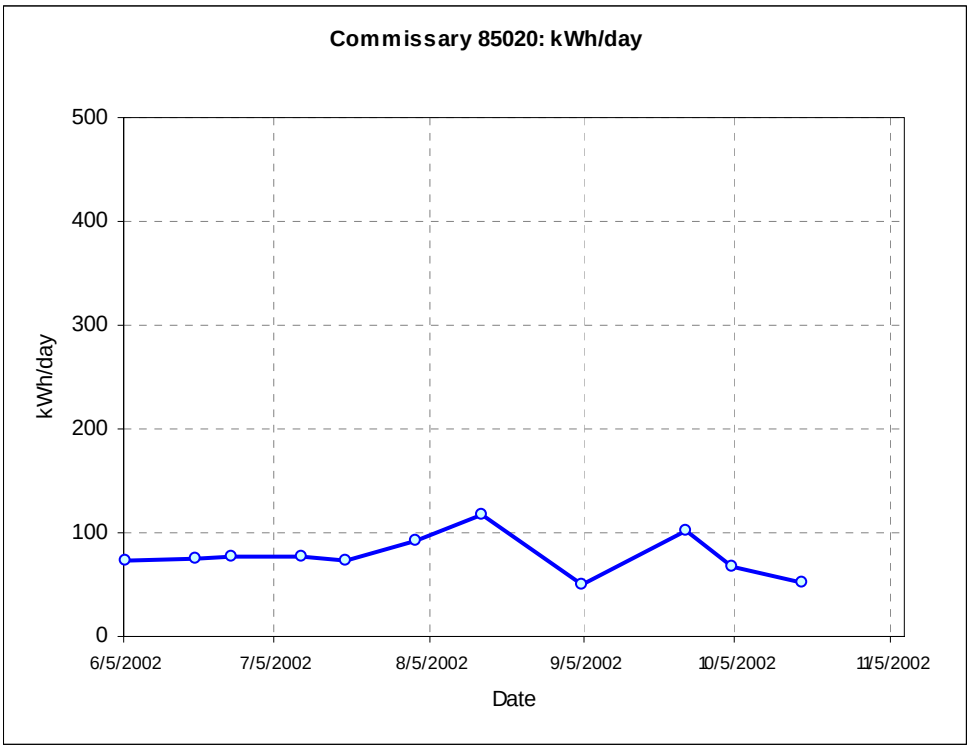
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   30
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     12
   ------------------------------------
       Ymean =    67.500
   ------------------------------------
      StdDev =    34.904
   ------------------------------------
    CV-StDev =    51.709 %
   ------------------------------------
```

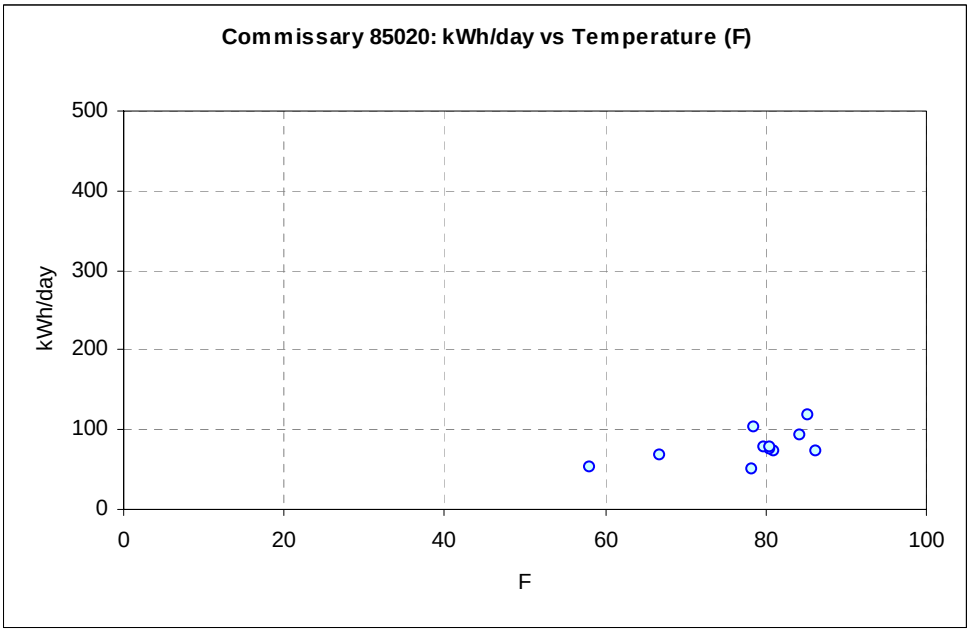

Walker Youth Service Center 85018: Gas use/day
Gas use/day
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
Tdb [°F]

12.3.17. 85020 Commissary

12.3.17.1. Electricity Use From Manual Readings

85020 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									10	118	
6/5/2002	37412	20272	6/5/2002	6/19/2002	14	20272	20375	103	1030	74	81.1
6/19/2002	37426	20375	6/19/2002	6/26/2002	7	20375	20427	52	520	74	80.6
6/26/2002	37433	20427	6/26/2002	7/10/2002	14	20427	20536	109	1090	78	79.7
7/10/2002	37447	20536	7/10/2002	7/19/2002	9	20536	20605	69	690	77	80.6
7/19/2002	37456	20605	7/19/2002	8/2/2002	14	20605	20706	101	1010	72	86.4
8/2/2002	37470	20706	8/2/2002	8/15/2002	13	20706	20826	120	1200	92	84.3
8/15/2002	37483	20826	8/15/2002	9/4/2002	20	20826	21061	235	2350	118	85.4
9/4/2002	37503	21061	9/4/2002	9/25/2002	21	21061	21168	107	1070	51	78.2
9/25/2002	37524	21168	9/25/2002	10/4/2002	9	21168	21260	92	920	102	78.7
10/4/2002	37533	21260	10/4/2002	10/18/2002	14	21260	21354	94	940	67	66.9
10/18/2002	37547	21354	10/18/2002	11/7/2002	20	21354	21459	105	1050	53	58.1
11/7/2002	37567	21459	11/7/2002	11/19/2002	12	21459	382	-21077	-210770		59.1
11/19/2002	37579	382	11/19/2002	1/0/1900	#####	382	0	-382	-3820	0	0.0

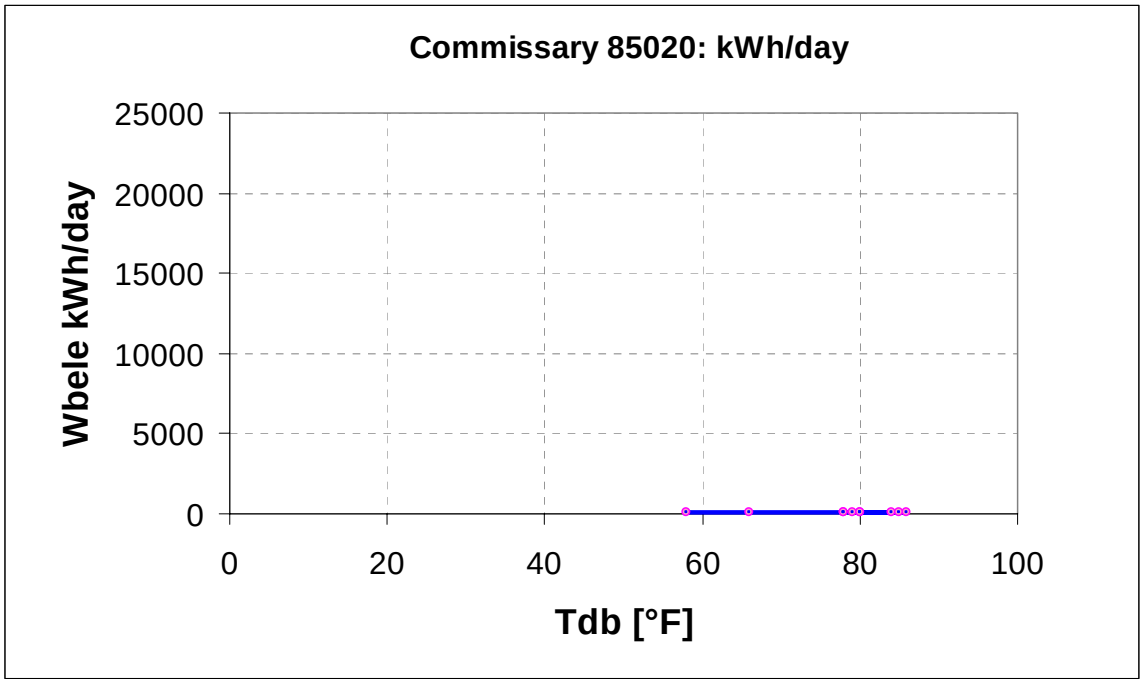

Commissary 85020: kWh/day
500
400
300
200
100
0
kWh/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Commissary 85020: kWh/day vs Temperature (F)
500
400
300
200
100
0
kWh/day
0
20
40
60
80
100
F

12.3.17.1.1. Baseline Model From Manual Readings

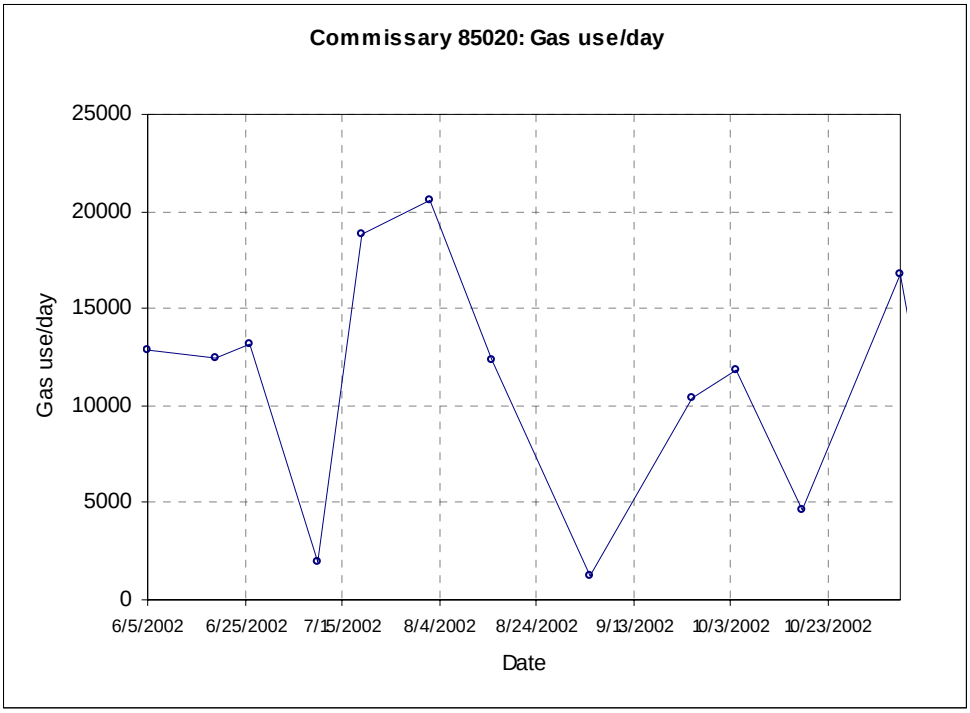
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 31
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

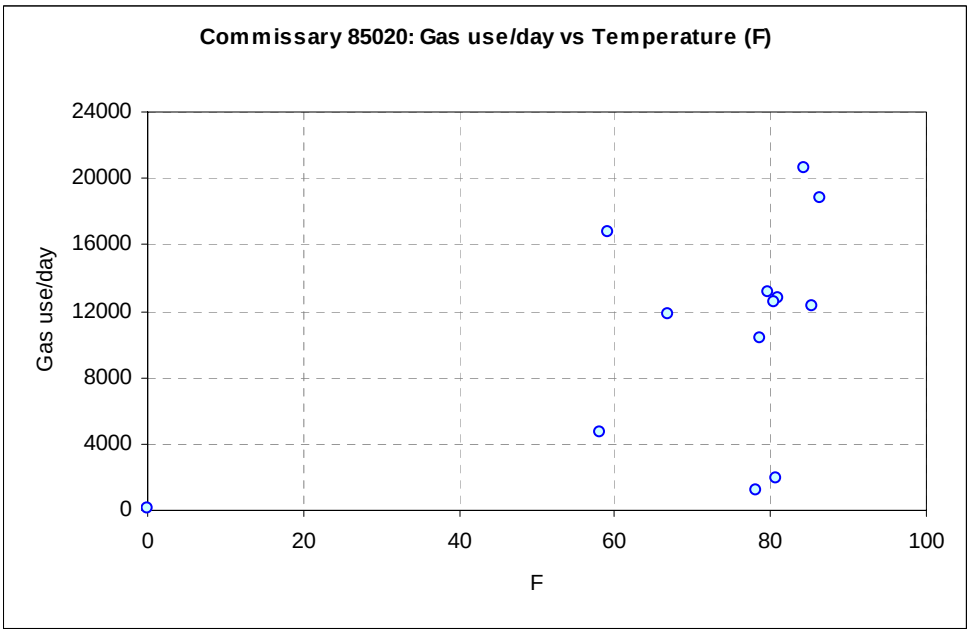
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   31
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     11
   ------------------------------------
       Ymean =    78.000
   ------------------------------------
      StdDev =    19.789
   ------------------------------------
    CV-StDev =    25.370 %
   ------------------------------------
```


Commissary 85020: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.17.2. Natural Gas From Manual Readings

85020 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(
									1		
6/5/2002	37412	1534563	6/5/2002	6/19/2002	14	1534563	1714246	179683	179683	12835	81
6/19/2002	37426	1714246	6/19/2002	6/26/2002	7	1714246	1801737	87491	87491	12499	80
6/26/2002	37433	1801737	6/26/2002	7/10/2002	14	1801737	1986307	184570	184570	13184	79
7/10/2002	37447	1986307	7/10/2002	7/19/2002	9	1986307	2003549	17242	17242	1916	80
7/19/2002	37456	2003549	7/19/2002	8/2/2002	14	2003549	2266532	262983	262983	18785	86
8/2/2002	37470	2266532	8/2/2002	8/15/2002	13	2266532	2533944	267412	267412	20570	84
8/15/2002	37483	2533944	8/15/2002	9/4/2002	20	2533944	2780079	246135	246135	12307	85
9/4/2002	37503	2780079	9/4/2002	9/25/2002	21	2780079	2806452	26373	26373	1256	78
9/25/2002	37524	2806452	9/25/2002	10/4/2002	9	2806452	2900316	93864	93864	10429	78
10/4/2002	37533	2900316	10/4/2002	10/18/2002	14	2900316	3065821	165505	165505	11822	66
10/18/2002	37547	3065821	10/18/2002	11/7/2002	20	3065821	3158956	93135	93135	4657	58
11/7/2002	37567	3158956	11/7/2002	11/19/2002	12	3158956	3360503	201547	201547	16796	59
11/19/2002	37579	3360503	11/19/2002	1/0/1900	####	3360503	0	-3E+06	-3E+06	89	0

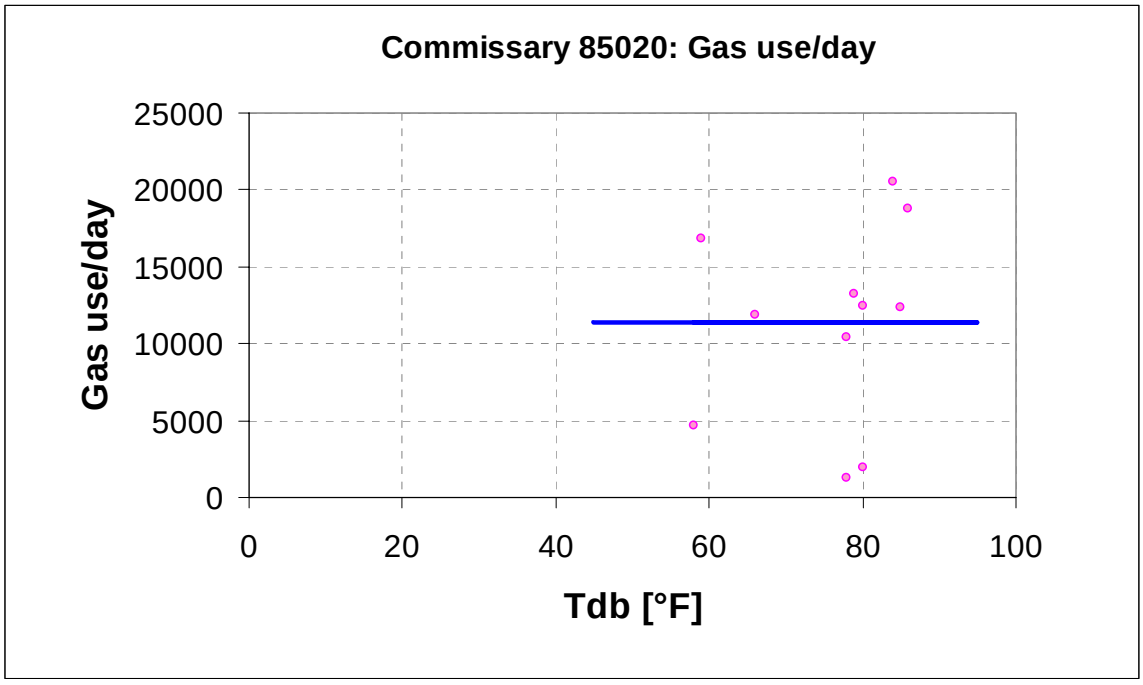

Commissary 85020: Gas use/day
25000
20000
15000
10000
5000
0
Gas use/day
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date


Commissary 85020: Gas use/day vs Temperature (F)
24000
20000
16000
12000
8000
4000
0
Gas use/day
0
20
40
60
80
100
F

12.3.17.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 32
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 1
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

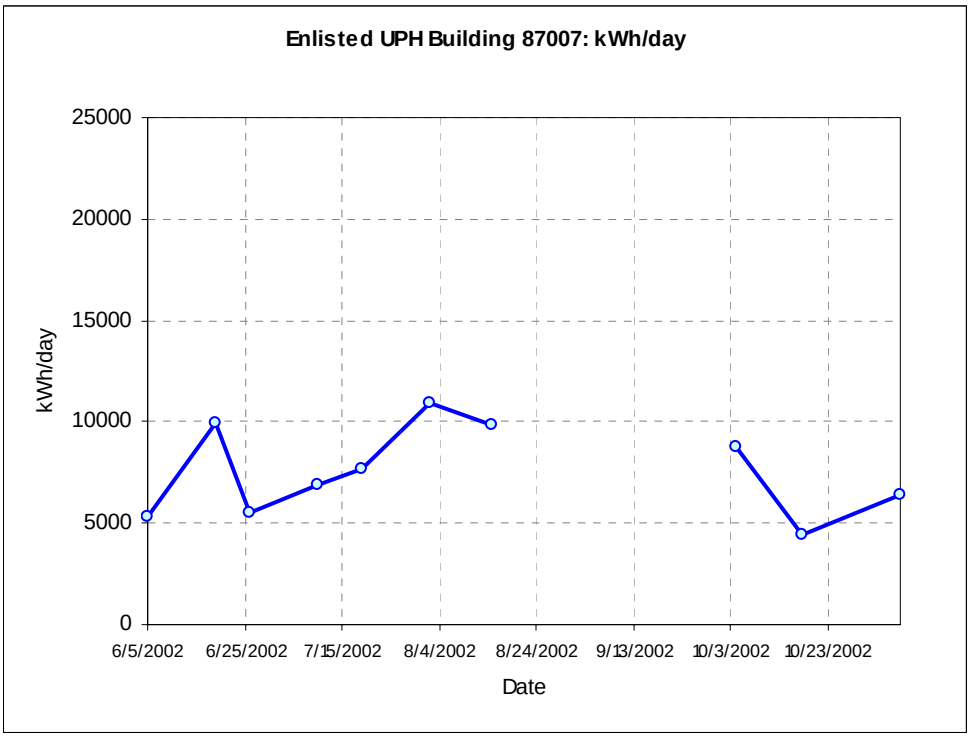
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           Mean
    Grouping column No =    4
    Value for grouping =   32
    Residual mode =         1
    # of X(Indep.) Var =    0
    Y1 column number =      1
    X1 column number =   0 (unused)
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
   ------------------------------------
           N =     12
   ------------------------------------
       Ymean = 11421.333
   ------------------------------------
      StdDev =  6138.158
   ------------------------------------
    CV-StDev =    53.743 %
   ------------------------------------
```

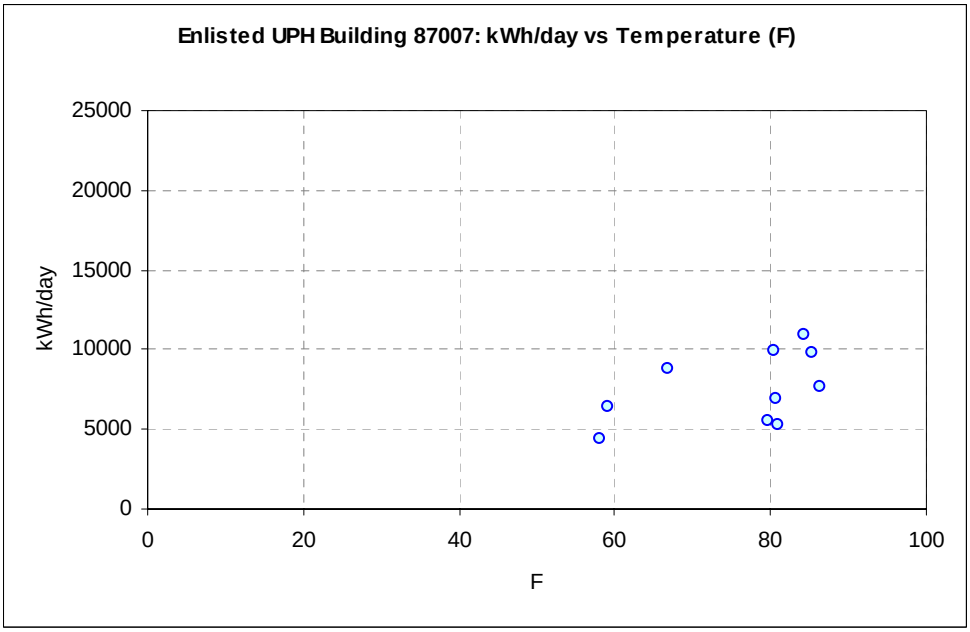

Commissary 85020: Gas use/day
Gas use/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.18. 91012 Admin/ Operational Testing

12.3.18.1. Electricity Use From Manual Readings

91012 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F
									2400		
6/5/2002	37412	5318	6/5/2002	6/19/2002	14	5318	5349	31	74400	5314	81.
6/19/2002	37426	5349	6/19/2002	6/26/2002	7	5349	5378	29	69600	9943	80.
6/26/2002	37433	5378	6/26/2002	7/10/2002	14	5378	5410	32	76800	5486	79.
7/10/2002	37447	5410	7/10/2002	7/19/2002	9	5410	5436	26	62400	6933	80.
7/19/2002	37456	5436	7/19/2002	8/2/2002	14	5436	5481	45	108000	7714	86.
8/2/2002	37470	5481	8/2/2002	8/15/2002	13	5481	5540	59	141600	10892	84.
8/15/2002	37483	5540	8/15/2002	9/4/2002	20	5540	5622	82	196800	9840	85.
9/4/2002	37503	5622	9/4/2002	9/25/2002	21	5622	???	#VALUE!	#VALUE!		78.
9/25/2002	37524	???	9/25/2002	10/4/2002	9	???	5702	#VALUE!	#VALUE!		78.
10/4/2002	37533	5702	10/4/2002	10/18/2002	14	5702	5753	51	122400	8743	66.
10/18/2002	37547	5753	10/18/2002	11/7/2002	20	5753	5790	37	88800	4440	58.
11/7/2002	37567	5790	11/7/2002	11/19/2002	12	5790	5822	32	76800	6400	59.
11/19/2002	37579	5822	11/19/2002	1/0/1900	####	5822	0	-5822	-1E+07	372	0.


Enlisted UPH Building 87007: kWh/day
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
6/25/2002
7/15/2002
8/4/2002
8/24/2002
9/13/2002
10/3/2002
10/23/2002
Date

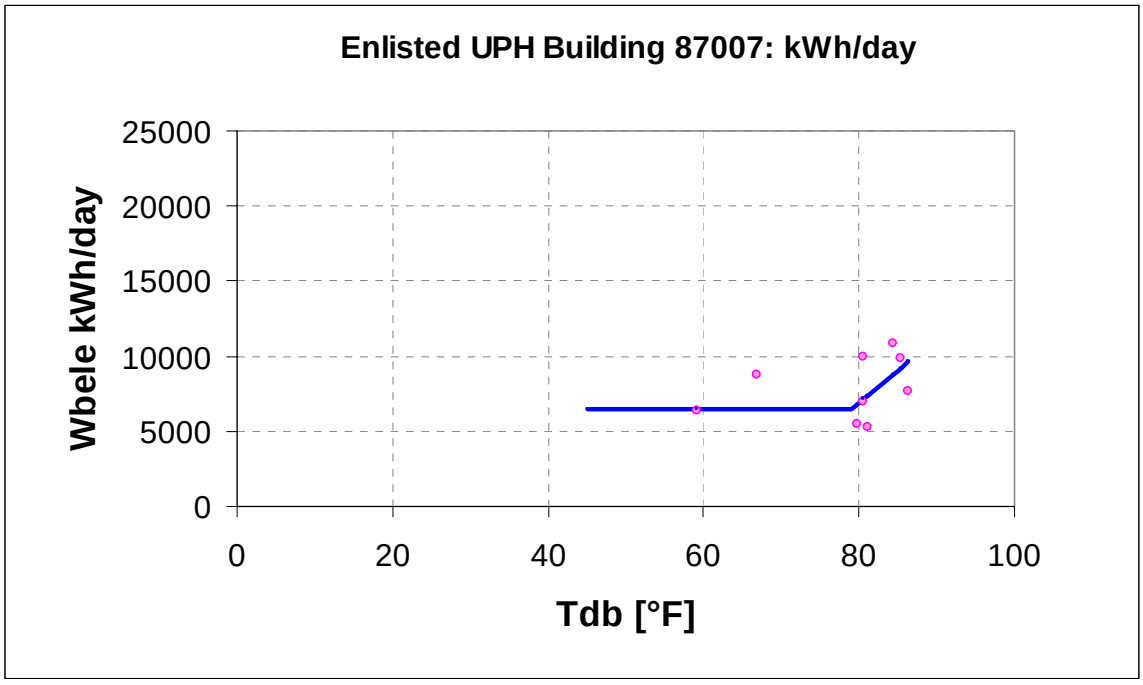

Enlisted UPH Building 87007: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
F

12.3.18.1.1. Baseline Model From Manual Readings

Enlisted UPH Building 87007

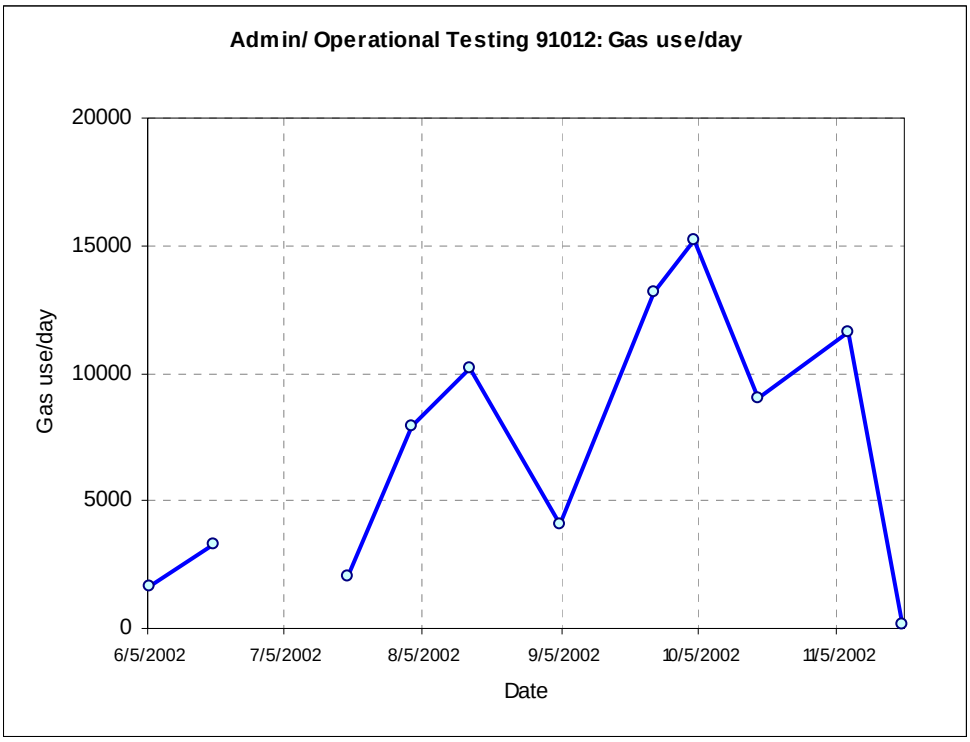
Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 33
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

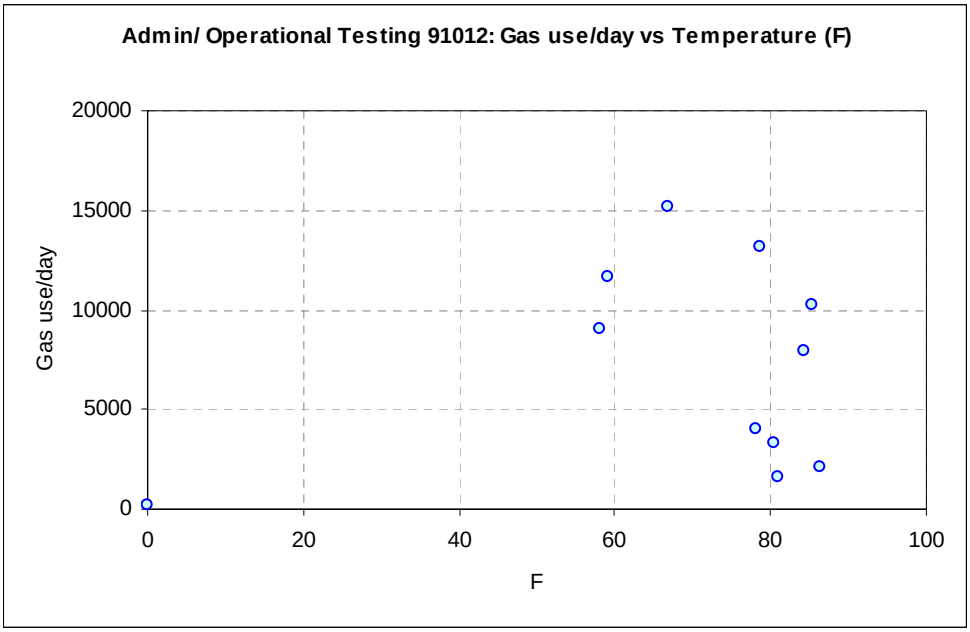
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           3P Cooling
    Grouping column No =    4
    Value for grouping =   33
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   3
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     10
          R2 =     0.283
       AdjR2 =     0.283
        RMSE =   1990.8556
     CV-RMSE =    26.298%
           p =    -0.522
          DW =     2.765 (p>0)
          N1 =      3
          N2 =      7
         Ycp =   6523.2280 (    862.4211)
          LS =      0.0000 (      0.0000)
          RS =    422.1847 (    237.6131)
         Xcp =     79.0420 (      0.5660)
```


Enlisted UPH Building 87007: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.18.2. Natural Gas From Manual Readings

91012 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F
									1		
6/5/2002	37412	5121951	6/5/2002	6/19/2002	14	5121951	5144856	22905	22905	1636	81
6/19/2002	37426	5144856	6/19/2002	6/26/2002	7	5144856	5167862	23006	23006	3287	80
6/26/2002	37433	5167862	6/26/2002	7/10/2002	14	5167862	5159271	-8591	-8591		79
7/10/2002	37447	5159271	7/10/2002	7/19/2002	9	5159271	5151169	-8102	-8102		80
7/19/2002	37456	5151169	7/19/2002	8/2/2002	14	5151169	5180104	28935	28935	2067	86
8/2/2002	37470	5180104	8/2/2002	8/15/2002	13	5180104	5283590	103486	103486	7960	84
8/15/2002	37483	5283590	8/15/2002	9/4/2002	20	5283590	5487964	204374	204374	10219	85
9/4/2002	37503	5487964	9/4/2002	9/25/2002	21	5487964	5573252	85288	85288	4061	78
9/25/2002	37524	5573252	9/25/2002	10/4/2002	9	5573252	5692095	118843	118843	13205	78
10/4/2002	37533	5692095	10/4/2002	10/18/2002	14	5692095	5904986	212891	212891	15207	66
10/18/2002	37547	5904986	10/18/2002	11/7/2002	20	5904986	6085658	180672	180672	9034	58
11/7/2002	37567	6085658	11/7/2002	11/19/2002	12	6085658	6225105	139447	139447	11621	59
11/19/2002	37579	6225105	11/19/2002	1/0/1900	####	6225105	0	-6E+06	-6E+06	166	0

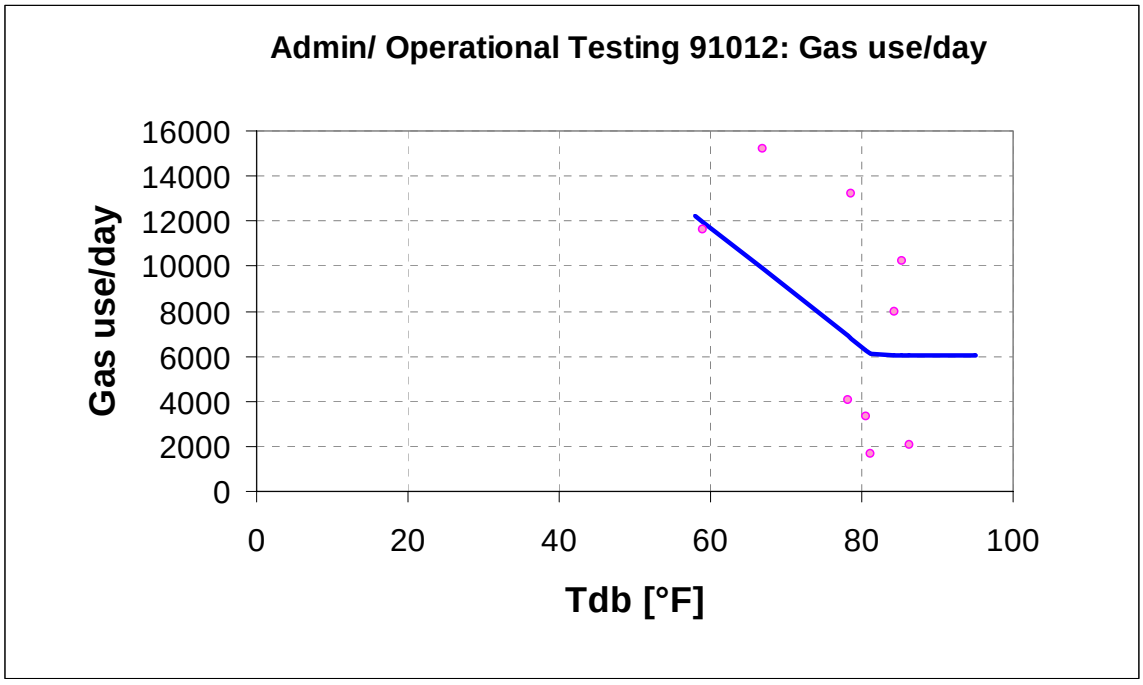

Admin/ Operational Testing 91012: Gas use/day
20000
15000
10000
5000
0
Gas use/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Admin/ Operational Testing 91012: Gas use/day vs Temperature (F)
20000
15000
10000
5000
0
Gas use/day
0
20
40
60
80
100
F

12.3.18.2.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 34
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

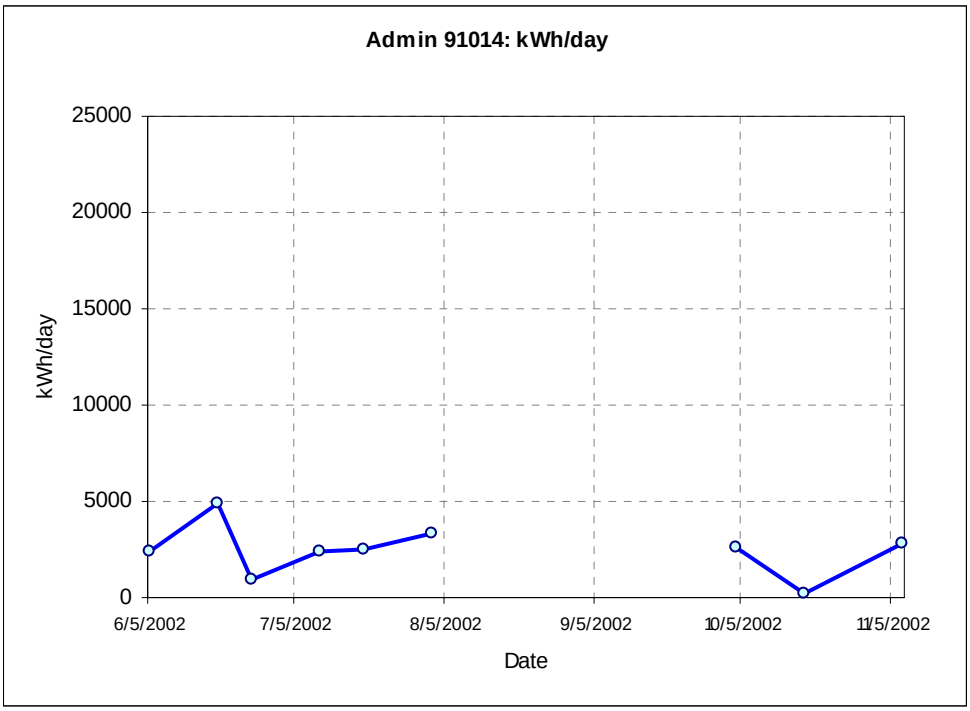
```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           3P Heating
    Grouping column No =    4
    Value for grouping =   34
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   3
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =     10
          R2 =     0.272
       AdjR2 =     0.272
        RMSE =   4385.8521
     CV-RMSE =    56.016%
           p =     0.104
          DW =     1.688 (p>0)
          N1 =      7
          N2 =      3
         Ycp =   6066.1943 (   1722.1790)
          LS =   -265.4202 (    153.6596)
          RS =      0.0000 (      0.0000)
         Xcp =     81.3060 (      0.5660)
```

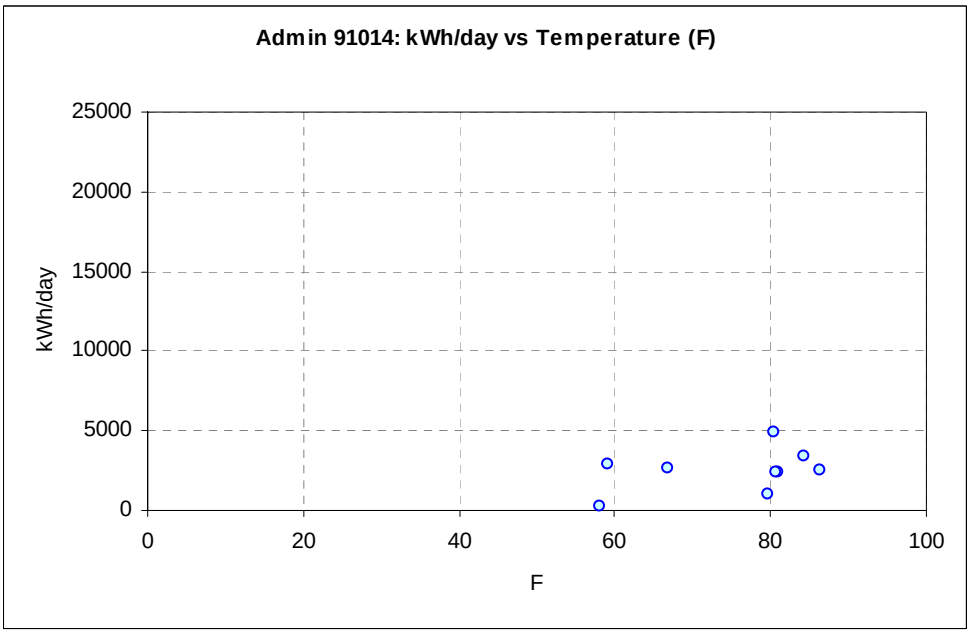

Admin/ Operational Testing 91012: Gas use/day
Gas use/day
16000
14000
12000
10000
8000
6000
4000
2000
0
0
20
40
60
80
100
Tdb [°F]

12.3.19. 91014 Admin

12.3.19.1. Electricity Use From Manual Readings

91014 Elec		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	a tem
									80		
6/5/2002	37412	60716	6/5/2002	6/19/2002	14	60716	61130	414	33120	2366	
6/19/2002	37426	61130	6/19/2002	6/26/2002	7	61130	61554	424	33920	4846	
6/26/2002	37433	61554	6/26/2002	7/10/2002	14	61554	61721	167	13360	954	
7/10/2002	37447	61721	7/10/2002	7/19/2002	9	61721	61986	265	21200	2356	
7/19/2002	37456	61986	7/19/2002	8/2/2002	14	61986	62426	440	35200	2514	
8/2/2002	37470	62426	8/2/2002	8/15/2002	13	62426	62969	543	43440	3342	
8/15/2002	37483	62969	8/15/2002	9/4/2002	20	62969	???	#VALUE!	#VALUE!		
9/4/2002	37503	???	9/4/2002	9/25/2002	21	???	???	#VALUE!	#VALUE!		
9/25/2002	37524	???	9/25/2002	10/4/2002	9	???	64500	#VALUE!	#VALUE!		
10/4/2002	37533	64500	10/4/2002	10/18/2002	14	64500	64958	458	36640	2617	
10/18/2002	37547	64958	10/18/2002	11/7/2002	20	64958	65014	56	4480	224	
11/7/2002	37567	65014	11/7/2002	11/19/2002	12	65014	65441	427	34160	2847	
11/19/2002	37579	65441	11/19/2002	1/0/1900	#####	65441	0	-65441	-5235280	139	

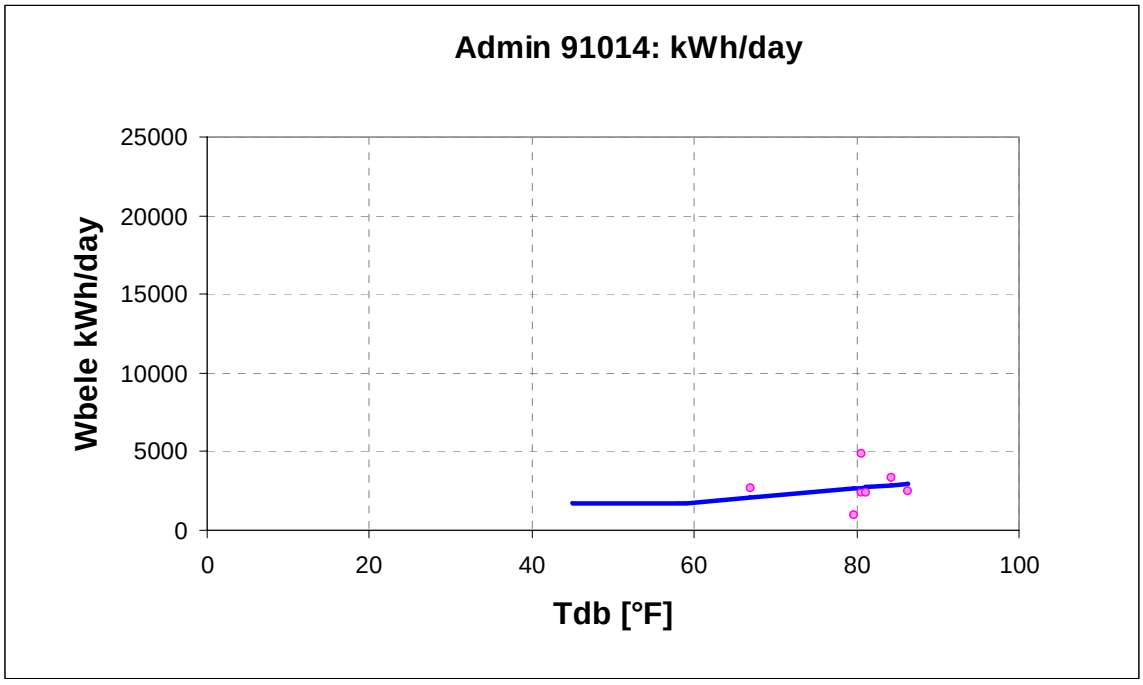

Admin 91014: kWh/day
25000
20000
15000
10000
5000
0
kWh/day
6/5/2002
7/5/2002
8/5/2002
9/5/2002
10/5/2002
11/5/2002
Date


Admin 91014: kWh/day vs Temperature (F)
25000
20000
15000
10000
5000
0
kWh/day
0
20
40
60
80
100
F

12.3.19.1.1. Baseline Model From Manual Readings

Path and name of input data file = Modeling00.prn
Value of no-data flag = -99
Column number of group field = 4
Value of valid group field = 35
Residual file needed (1 yes, 0 no) = 1
Model type (1:Mean,2:2p,3:3pc,4:3ph,5:4p,6:5p,7:MVR,8:HDD,9:CDD) = 3
Column number of dependent Y variable =1
Number of independent X variables (0 to 6) = 1
Column number of independent variable X1 = 3
Column number of independent variable X2 = 0
Column number of independent variable X3 = 0
Column number of independent variable X4 = 0
Column number of independent variable X5 = 0
Column number of independent variable X6 = 0

```
*****************************************
  ASHRAE INVERSE MODELING TOOLKIT (1.9)
 *****************************************
    Output file name = IMT.Out
 *****************************************
    Input data file name =  Modeling00.prn
    Model type =           3P Cooling
    Grouping column No =    4
    Value for grouping =   35
    Residual mode =         1
    # of X(Indep.) Var =    1
    Y1 column number =      1
    X1 column number =   3
    X2 column number =   0 (unused)
    X3 column number =   0 (unused)
    X4 column number =   0 (unused)
    X5 column number =   0 (unused)
    X6 column number =   0 (unused)
 *****************************************
    Regression Results
           N =      9
          R2 =     0.144
       AdjR2 =     0.144
        RMSE =   1305.2665
     CV-RMSE =    53.238%
           p =    -0.518
          DW =     2.903 (p>0)
          N1 =      1
          N2 =      8
         Ycp =   1677.4966 (    835.2950)
          LS =      0.0000 (      0.0000)
          RS =     46.6522 (     42.9618)
         Xcp =     58.6660 (      0.5660)
```


Admin 91014: kWh/day
Wbele kWh/day
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
Tdb [°F]

12.3.19.2. Natural Gas From Manual Readings

91014 Gas		Reading	Date Begin	Date End	# of days	Reading Begin	Reading End	Counts per period	Use per period	Use per day	avg temp(F)
									1		
6/5/2002	37412	0	6/5/2002	6/19/2002	14	0	0	0	0	0	81.1
6/19/2002	37426	0	6/19/2002	6/26/2002	7	0	0	0	0	0	80.6
6/26/2002	37433	0	6/26/2002	7/10/2002	14	0	0	0	0	0	79.7
7/10/2002	37447	0	7/10/2002	7/19/2002	9	0	0	0	0	0	80.6
7/19/2002	37456	0	7/19/2002	8/2/2002	14	0	0	0	0	0	86.4
8/2/2002	37470	0	8/2/2002	8/15/2002	13	0	5487964	5E+06	5E+06	422151	84.3
8/15/2002	37483	5487964	8/15/2002	9/25/2002	41	5487964	5573252	85288	85288	2080	85.4
9/25/2002	37524	5573252				5573252					78.7

12.3.19.2.1. Baseline Model From Manual Readings

No baseline model available for this site.

12.4. Resolution of Steam Metering Problem at 87000 Block

As of December 20th, 2002, problems remain with the steam metering at the 87000 block thermal plant. The source of the problems has yet to be determined. Therefore, the data recorded for the steam meter remain unreliable. Efforts have been made to contact SiTEX and the manufacturer to resolve this problem. However, a satisfactory solution has yet to be determined. Effort will continue on this in January 2003.

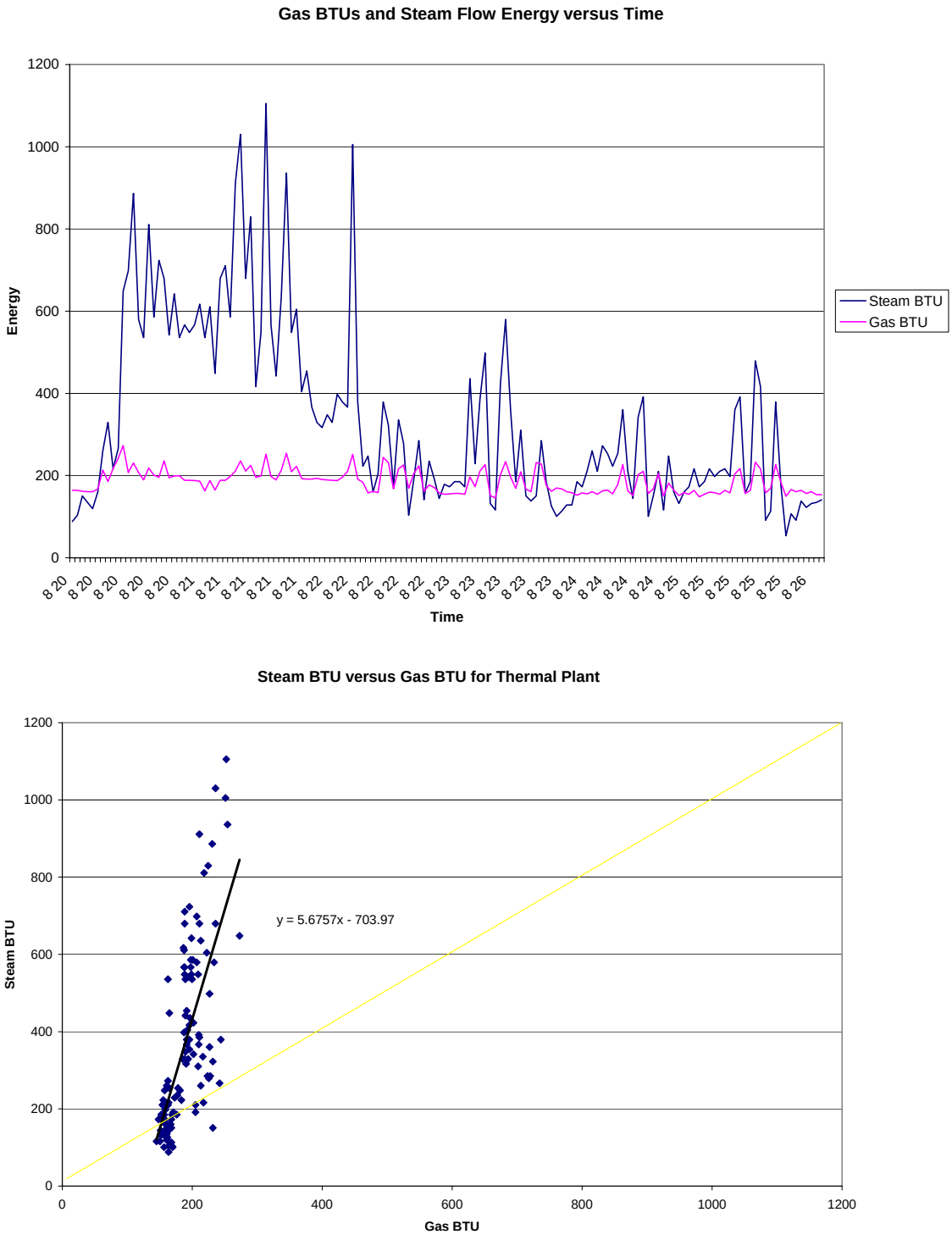


Figure 12.5-1: Resolution of Differences Between Steam Metering and Gas Data – 87000 Thermal Plant.